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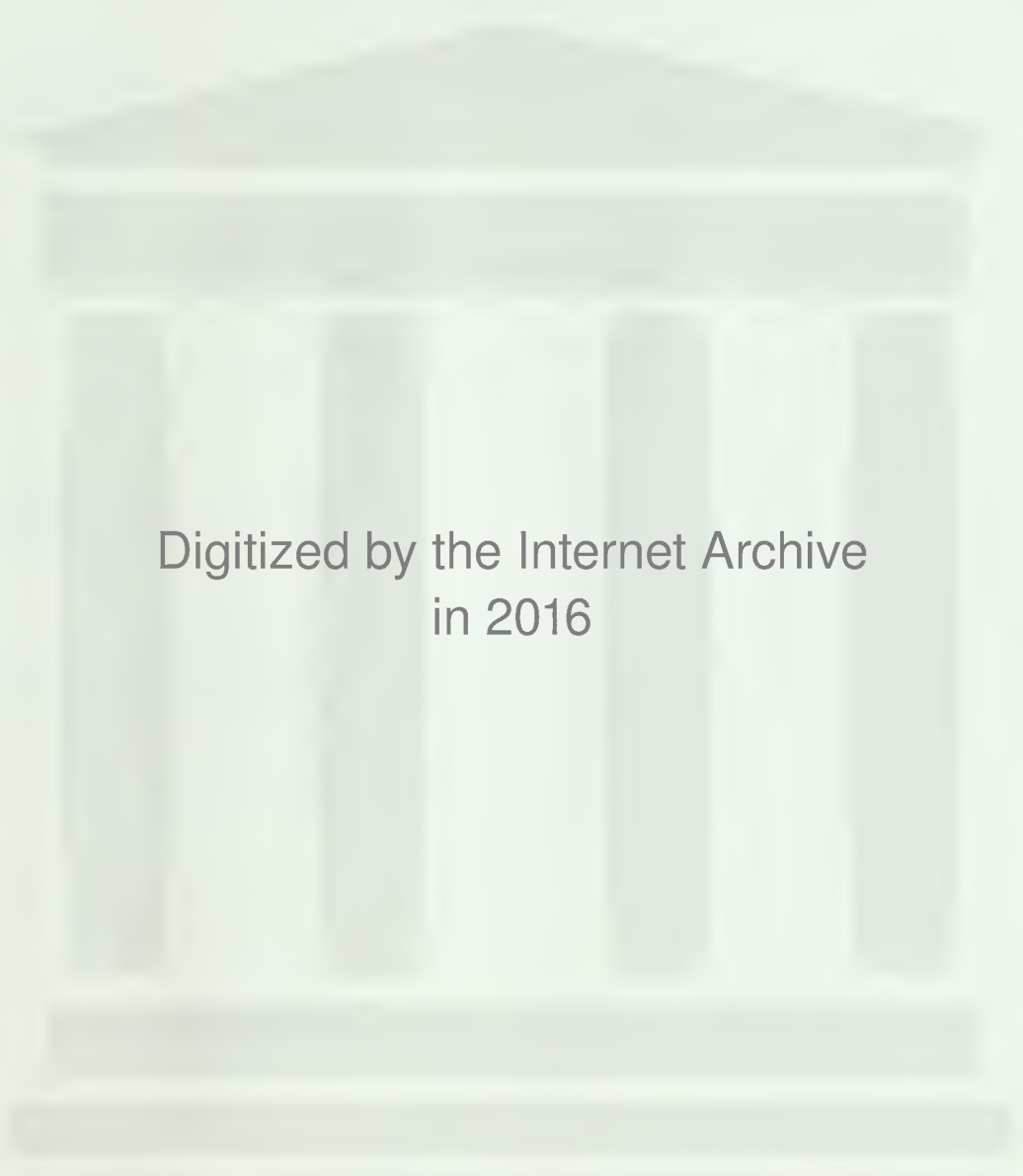
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A COGNITIVE ANALYSIS OF THE "SOCIAL DEPRIVATION-
SATIATION EFFECT"

by

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A dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor of
Philosophy in the Department of Psychology
in the Graduate School of Arts and
Sciences of Duke University

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ABSTRACT

(Psychology-Personality)

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ABSTRACT

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This paper offers a cognitive interpretation of the "Social Deprivation-Satiation Effect" (SDSE). This effect is characterized by an inverse relation between the frequency of social reinforcement received in a standard treatment period and the effectiveness of that reinforcer in a subsequent test. Children subjected to a deprivation treatment (in which they receive social reinforcement in a low frequency) typically make a greater number of "correct" responses in a discrimination test where the correct response awards the subject a social reinforcement than children receiving a satiation treatment involving a high frequency of noncontingent reinforcement.

The SDSE was interpreted in the past in various ways, including general arousal, sensory deprivation, and affective valence. However, the most influential interpretation describes the effect as a reflection of social-drive conditions. Social drive was equated in this interpretation to animal appeti-

tive drives.

The cognitive interpretation of SDSE claims that the effect is mediated by the learning of reinforcement value of the particular source of the reinforcing stimuli. It stresses the role of the information extracted from the deprivation and satiation treatments, and focuses on the child's perception of the contingencies of the interaction between himself and a particular experimenter. The suggested interpretation rejects the notion that the SDSE could totally be accounted for by the sheer number of social reinforcements received in the pretest treatment period.

Two hypotheses were derived from the suggested cognitive interpretation, predicting (a) that SDSE is a person-specific effect, not readily generalizable to other reinforcing persons; and (b) that the SDSE pattern can be created by providing the subjects appropriate informational input without subjecting them to actual deprivation or satiation treatments. It was further predicted that the information will strongly interact with the actual treatments.

In the first experiment, subjects received a deprivation or a satiation treatment, and were then given a 75-trial discrimination test. The test was administered either by the treating experimenter or by another, unknown experimenter. The nonpreferred choice in the discrimination test was reinforced with good, and the dependent variable was the number of reinforced responses in the 75-trial test. Middle-class groups showed a typical SDSE pattern in the Same-E conditions, but the difference between the groups was

minimized in the Other-E condition. Thus, they showed a high degree of person specificity. Low-class groups showed only a weak tendency toward a SDSE pattern, with no person specificity.

In the second experiment, subjects received two remote treatments from E_1 , and were given a third treatment (from E_2) on the third day. This last treatment was immediately followed by the discrimination test, administered by E_1 . The results of the middle-class groups indicated a relatively high level of person specificity, although the immediate treatment somewhat affected performance as well. Low-class subjects gave a generalized and undifferentiated performance, with no person specificity whatsoever.

In the third experiment, subjects received information about the reinforcing characteristics of the experimenter prior to the actual treatment. They were told either that the experimenter says good "many, many times" or "very few times." Middle-class results showed a strong effect of the informational input and an even stronger interaction effect between the information and the actual treatment. The low-class groups showed no effect of the informational input, with a weak tendency toward an effect of the actual treatment.

The two hypotheses were thus confirmed with the middle-class groups. The independent variables, however, failed to produce differential effects in the low-class children. These differences were discussed, and it was suggested that the low-class children failed to cognize as hypothesized due to a combination of (a) long-term social deprivation, (b) an unstable environment

which increases dispositions to react to the immediate and concrete, and (c) the arousing nature of the experimental situation. Further discussion compared the suggested cognitive interpretation with traditional S-R theory and pointed to similar cognitive outlook on the part of several researchers in other branches of social psychology.

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Elisha Babad

CONTENTS

ABSTRACT	iii
ACKNOWLEDGMENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
INTRODUCTION	2
Research on Social Deprivation and Satiation	4
Reinforcement, Deprivation and Social Class	23
Overview of the Three Studies	27
METHOD	30
PERSON SPECIFICITY	38
First Experiment--"Same" and "Other" Experimenters	38
Second Experiment--"Remote" and "Immediate" Treatments	61
EFFECTS OF INFORMATIONAL INPUT	74
Third Experiment--"Few" and "Many" Information	74
DISCUSSION	93
Summary of Results	93
The Cognitive Interpretation in Perspective	96
Further Directions of Research	103
Social-Class Differences	105
APPENDIX	109
REFERENCES	116

LIST OF TABLES

Table

1	Details of the Experimental Series	37
2	Analysis of Variance of Test Scores for Middle-Class Subjects in Experiment 1	41
3	Analysis of Variance of Test Scores for Low-Class Subjects in Experiment 1	50
4	Analysis of Variance of Test Scores for All Subjects in Experiment 1	59
5	Analysis of Variance of Test Scores for Low-Class Subjects in Experiment 2	65
6	Analysis of Variance of Test Scores for Middle-Class Subjects in Experiment 2	66
7	Analysis of Variance of Test Scores for All Subjects in Experiment 2	67
8	Analysis of Variance of Test Scores for Middle-Class Subjects in Experiment 3	78
9	Analysis of Variance of Test Scores for Low-Class Subjects in Experiment 3	83
10	Analysis of Variance of Test Scores for All Subjects in Experiment 3	84
11	Analysis of Variance of Test Scores for Low-Class Subjects in Experiments 1 and 3	87
12	Analysis of Variance of Test Scores for Middle-Class Subjects in Experiments 1 and 3	88

LIST OF FIGURES

Figure

1	Test Performance of Groups in the Four Experimental Conditions (Experiment 1, Middle-Class Subjects).	43
2	Trends in the Test Performance of the Four Experimental Groups (Experiment 1, Middle-Class Subjects).	46
3	Test Performance of Groups in the Four Experimental Conditions (Experiment 1, Low-Class Subjects).	52
4	Test Performance of Low- and Middle-Class Groups in the Four Experimental Conditions (Experiment 1).	55
5	Trends in the Test Performance of the Four Experimental Groups (Experiment 1, Low-Class Subjects).	58
6	Test Performance of Low- and Middle-Class Groups in Four Combinations of Remote and Immediate Treatments	70
7	Pattern of Test Performance of Low- and Middle-Class Groups Who Received Both Information and Treatment.	80
8	Patterns of Test Performance in Combinations of Informational Input and Actual D- and S-Treatments.	90

A COGNITIVE ANALYSIS OF THE "SOCIAL DEPRIVATION-
SATIATION EFFECT"

INTRODUCTION

This study seeks to analyze the "Social Deprivation-Satiation Effect" (SDSE) from a cognitive perspective which emphasizes the learning supposedly mediating this effect. Social and cognitive variables were not treated in earlier formulations, and the effect was discussed in terms of "social drive" analogous to primary drives such as hunger. This paper minimizes the role of motivational states in SDSE, stressing instead the importance of the social interaction between the subject and the particular reinforcing agent, the learning of reinforcement value which is associated with the source of these stimuli and the cognitive aspects characterizing this learning.

The "Social Deprivation-Satiation Effect" refers to the inverse relation between the frequency in which a social reinforcer has been dispensed in a given period (treatment) and its reinforcing efficacy in a subsequent (discrimination) learning task. In the treatment period, the experimenter typically pretends to be busy with some paper work, but she emits the stimulus word good in either a low ("deprivation") or high ("satiation") frequency.

Compared with control groups who undergo no treatment previous to the test, groups who are socially reinforced in a high frequency during the pretest treatment are found to give only a small number of "correct" responses (less-preferred choice in a discrimination task) when the correct response is reinforced with good. On the other hand, the social reinforcer gains in efficacy when the word good is dispensed in a very low frequency during the pretest treatment (see Gewirtz, 1967).

In animal studies, a measure of deprivation (such as length of food deprivation) many times serves to define operationally the drive state. Since SDSE was seen by some to represent an analogous situation, it is not surprising to find interpretations of the social deprivation operation which stress its effect on levels of social drive. "Drive" is a concept which carries certain implications for researchers in the field of learning, and some of these implications tend to generalize to "social drive" when the latter is so explicitly equated with animal appetitive drives (Gewirtz & Baer, 1958a). One such line of implication bases drive on a homeostatic model which assumes that variations in behavior are influenced by a need to reduce tensions. While this approach focuses on the motivational state of the deprived or satiated individual, this paper advocates that social and cognitive variables which are involved in the situation must be studied as well, and that an appropriate conceptualization of SDSE must include all.

The social variables studied here have to do mainly with the importance of the interaction between subject and experimenter, rather than

focusing on the state of the individual subject alone. Two of this paper's three experiments study the question whether the SDSE is a person-specific effect. As to the cognitive aspects, particular reference is made to the acquisition of reinforcement value and its underlying mechanisms. The research also explores (third experiment) the possibility of creating similar patterns of performance by use of informational input alone. Thus, this conceptualization emphasizes the role of learning of a specific type which is related to a specific source of stimulation.

Another approach to SDSE limits its scope to the functional relationship between environmental events (stimuli) and behavioral outcomes (responses). Although our approach has little in common with such a (presumably) atheoretical approach, we will discuss our findings in these terms, trying to set limits to the generality of such statements of functional relations.

Research on Social Deprivation and Satiation

The first studies on the effects of relative social deprivation and satiation were carried out by Gewirtz and Baer in the late 1950s (Gewirtz & Baer, 1958a, 1958b; Gewirtz, Baer & Roth, 1958). Most of the more recent studies reviewed in this paper actually grew out of these now classical reports. The Gewirtz and Baer studies, which serve as the pivot of our discussion,

offered a social-drive interpretation of the SDSE. However, the use of this concept is nominal only, with no explicit theoretical perspective being offered to substantiate the theory. In recent writings, Gewirtz (1969b) tried to minimize some implications of the social-drive notion, claiming this term was used "to provide historical context only." Other researchers (Walters, Endo, Rosenhan) viewed "social drive" from a Hullian (or neo-Hullian) drive-reduction perspective. This line of research deals with the role of general arousal or anxiety (D) in the deprivation effect and the specificity of reinforcers which gain in value following social deprivation. Stevenson and Hill dealt with the sensory aspects of the isolation procedure, which was used to create social deprivation in the early studies. (See later discussion for details.)

Zigler and his associates presented a cognitive perspective on social learning, emphasizing the interaction between subject and experimenter and the role it plays in the acquisition of certain expectations and response tendencies. This general outlook is shared by the present author, and our suggested interpretation of SDSE stresses the learning of reinforcement value.

1. Social-Drive Interpretation: Gewirtz and Baer

In these well-known studies, Gewirtz and Baer (1958a, 1958b; Gewirtz, Baer & Roth, 1958) created social deprivation by a brief period of social isolation and satiation by a period of social interaction with an abundance of approval and social contact with the experimenter. Control groups were

tested with no pretest deprivation or satiation treatment periods. The learning task was the "Marble In The Hole" (MITH) game in which marbles were to be dropped into one of two holes. The hole less frequently chosen in a base-line period became the "correct" one, correct responses being reinforced with good (at a given schedule of reinforcement). The dependent variable--effectiveness of social reinforcer--was measured as change in relative frequency of correct responses in each minute of play.

The results consistently showed highest reinforcer effectiveness for deprivation groups and lowest for satiation groups, with control groups showing intermediate results. The results were interpreted in terms of a "social drive" conceived to be analogous to primary appetitive drives such as hunger. The deprivation and satiation operations were labeled "drive operations" and described as "social hunger."

A number of studies deal with this conceptualization. Walters and his associates (see later discussion for details) wondered whether social drive is not equivalent to D, a generalized arousal state of the individual. Other researchers claimed that the social drive is specifically social and does not result in general arousal. Marilyn Erickson (1962) reasoned that social deprivation increases social drives only, resulting in increased effectiveness of social reinforcers but not of nonsocial ones. This view was contrasted with the arousal conception, which was hypothesized to predict increase in effectiveness of all reinforcers following deprivation. Deprivation and satiation operations consisted in Erickson's study of a short period in

which the subjects received no good emissions at all ("deprivation") or thirty good emissions ("satiation"). This was followed by a discrimination task where the correct response was reinforced with social or nonsocial (marble) reinforcement. The results showed a clear deprivation effect for social reinforcers but no effect whatsoever for nonsocial ones. In a similar study, Dorwart, Ezerman, Lewis and Rosenhan (1965) defined deprivation and satiation in terms of the character of a three-minute interaction between the subject and the experimenter on the way from the classroom to the experimental room (warm and approving vs. cold, remote and noncommunicative). They also concluded that the effectiveness of nonsocial reinforcers (red lights) is not influenced by operations of social deprivation and satiation. Endo (1968) used isolation to produce deprivation, and his conclusions are similar to the previous two studies.

Berkowitz (1964) used a research design similar to that of Gewirtz and Baer to compare normal and schizophrenic subjects. His conclusions were stated in terms of social drive--he stated that social deprivation increases social drive--leading to increased responsiveness to social reinforcers. It is interesting to note that in his later work (e.g. Berkowitz & Zigler, 1965) Berkowitz abandoned the drive interpretation in favor of a learning interpretation of social deprivation.

2. Anxiety (Arousal) Interpretation: Walters

Viewing Gewirtz and Baer's findings in a neo-Hullian perspective,

Walters and his associates suggested that differences between isolated and nonisolated children were due to the emotionally arousing nature of isolation. Spence's (1958, and see also Taylor & Spence, 1952) theory of emotionally based drive (D) provided the basis for the claim that the effect of isolation in increasing reinforcer effectiveness was mediated by the subjects' arousal (or anxiety). In other words, the isolation procedure was conceived to intensify D rather than S_D .

To test this idea, Walters and his associates tried to separate arousal from isolation by creating arousal situations with no isolation and isolation without arousal. They predicted that isolation without arousal would not increase reinforcer effectiveness. Walters and Ray (1960) subjected groups of children to social isolation, while other children were allowed to play outside with their peers prior to testing (presumably a "satiation" procedure). Arousal was manipulated by the behavior of the person who brought the subject to the experimental room: a strange, unfriendly assistant in the case of high arousal and a friendly, known secretary in the case of low arousal. The results showed two main effects but no interaction effect. Thus, arousal was shown to increase reinforcer effectiveness and isolation was shown to increase reinforcer effectiveness, but one factor did not interact with the other. Independent of arousal, isolation still increases reinforcer effectiveness. Strangely, Walters and Ray concluded that arousal was the major factor in facilitating learning. (Moreover, the isolation effect would probably have been stronger were the satiation operation not so remote in nature

from the testing situation.)

Walters and Parke (1964) replicated the earlier study with older subjects, adding a dubious physiological measure of arousal--finger temperature. As in the previous study, the subjects did not see the testing experimenter until the testing stage, and all social interactions (including all arousal and deprivation operations) were carried out with another person. Under these conditions, only the arousal effect reached statistical significance. Walters and Parke concluded that reinforcers are more effective if the recipient is anxious or aroused. According to this paper's perspective, deprivation effects are person-specific, and no deprivation effect should have been expected in the Walters and Parke study, since the testing experimenter did not give the deprivation and satiation treatments to the subjects.

Walters, Marshall and Shooter (1960) isolated older subjects (adolescents) by leaving them alone to answer tests and manipulated arousal by the tone of the instructions. They reported a statistically significant arousal effect and no isolation effect, but this could be expected in any case due to the remoteness of the isolation procedure from the criterion discrimination task.

This paper does not seek to dispute nor to explain findings showing that arousal increases social reinforcer effectiveness, but it questions the contribution of the Walters studies to the explanation of SDSE. In addition to the great differences between the testing conditions and the pretest situation (which would tend to minimize the effects of these earlier treatments),

Endo (1968) pointed out that in these studies anxiety was aroused before the deprivation and not by the deprivation.

A more critical question is whether Walters and his associates proposed an explanation to isolation effects only or to social deprivation in general. Gewirtz and Baer used isolation techniques to create social deprivation, but isolation and deprivation are, nevertheless, not identical. It seems that Walters' conclusions must be limited to isolation alone, especially since he did not even treat the satiation condition in Gewirtz and Baer's early studies. Gewirtz's recent studies (1967, 1969a) created deprivation and satiation without isolation, ruling out the arousal explanation.

As mentioned earlier, Endo (1968), Erickson (1962) and Dorwart et al. (1965) compared the D and S_D conceptualizations of social drive, deriving a prediction of increase in the effectiveness of all reinforcers (social and non-social) following deprivation for the D conceptualization and a prediction of selective increase in effectiveness of social reinforcer only for the S_D perspective. The results of all three studies showed consistently an increase in effectiveness of social reinforcers only, but not of nonsocial ones.

3. Sensory Deprivation Interpretation: Stevenson

Stevenson and Odom (1962) suggested that isolation creates a general stimulus deprivation and that Gewirtz and Baer's results are due to the sensory aspects of isolation. To test this hypothesis, they compared isolated groups which did and did not have toys to play with. The results showed no

toy effect, implying that the social aspect of isolation plays the major role.

A later study by Hill and Stevenson (1964) replaced the toys with a movie rich in visual stimulation. The results reversed the earlier finding, indicating that the sensory rather than the social deprivation aspect played the major role. The difference between the two studies was explained by pointing to the nature of the stimuli, Hill and Stevenson claiming that, while active playing was weaker than the social aspect, the direct sensory experience of the film was stronger than these social aspects. (An alternative explanation would be simpler: the film was exciting enough to prevent the feeling of isolation, while toy playing was not.)

In the evaluation of the sensory deprivation interpretation of SDSE, it must be said that this interpretation cannot fully account for the phenomenon. First, it is applicable only to isolation procedures, while Gewirtz's recent studies showed satiation and deprivation effects without isolation at all. Secondly, even within the isolation framework, these studies dealt only with the deprivation effect and not with the satiation effect. A third point is that the results of Stevenson's two studies were not consistent, eliminating the possibility of reaching a comprehensive generalization regarding the sensory aspects of deprivation.

4. Functional Relationship Position: Gewirtz (1967 to present)

In his recent writings, Gewirtz retracted his earlier social-drive interpretation of SDSE. "Although Baer and I thought it gratuitous to apply

the term 'social-drive' to such functional relation, as has often been done, we did so to provide historical context for our results, much to our subsequent regret" (Gewirtz, 1969b). The SDSE effect was not explained at all in these recent writings, but rather it was described by Gewirtz as the result of a "setting condition," characterized by a functional relationship between environmental events and subsequent behavior. Declining to use intervening variables and "mentalistic" terms, Gewirtz now describes the effect as the inverse functional relationship between frequency of social-reinforcing stimuli and their efficacy in subsequent conditioning.

It is difficult to take issue with this formulation of SDSE, simply because Gewirtz does not explicitly suggest any explanation of the effect beyond his data, and he limits his discussion to the operational variables.

In contrast to the absence of a theoretical contribution, Gewirtz's recent experimental evidence deals effectively with some of the criticisms directed at the early studies. Gewirtz abandoned the isolation techniques and employed instead a standard treatment period in which social reinforcement is dispensed at a low frequency (deprivation) or high frequency (satiation). By so doing, he succeeded in detaching SDSE from the much-debated isolation technique and minimizing irrelevant differences between the deprivation and satiation operations.

In these recent studies (Gewirtz, 1967, 1969a; Landau & Gewirtz, 1967), the experimenter sat with the subjects throughout the experimental period. This period was divided into two stages: treatment and test.

During the ten-minute treatment, the stimulus word good was dispensed a given number of times, noncontingent upon specific behaviors of the subjects. Following the treatment, the subjects were presented with a simple discrimination task, their least preferred choice continuously reinforced with good. The results showed that the effectiveness of the stimulus word good in the test (number received) was an inverse function of the number of instances of good received in the pretest treatment.

Gewirtz (1967, 1969a) has dealt also with related "setting conditions." The first was "recovery from satiation," which was operationally defined by varying the length of the interval between treatment and test. Gewirtz found satiation and recovery to produce opposite effects, and thus described deprivation as "recovery from satiation." The second setting condition is "maintenance level," related to Helson's adaptation level concept. Satiation was described as an increase in rate of reinforcement from an established maintenance level, while deprivation was described as a decrease in rate. Gewirtz (1967) first established a base-line rate of reinforcement, and then changed the schedule to either a higher rate (satiation) or a lower rate (deprivation). Comparing the performance of these groups in the discrimination test, he found a deprivation-satiation-like effect. Other studies also report similar effects of shifts from a given maintenance level. Crandell (1963) and Crandell, Good and Crandell (1964) demonstrated this effect with variations in adult attention to children; Zigler (1961) reported similar results following changes in the experimenter's behavior from "support"

(warmth and pleasantness) to "nonsupport" (and vice versa) on the behavior of mentally retarded children; Stevenson and Snyder (1960) obtained similar results following shifts of reward and punishment; Cohen, Greenbaum and Mansson (1963) created a "high-deprivation" condition by lowering to zero the frequency of social reinforcement given to students in an interview; and Baron (1966) reported equivalent affective reactions to shifts in rate of reinforcement.

The maintenance level idea can be seen to imply (although I doubt that Gewirtz would agree) that the subjects judge the frequency of reinforcement at a given period on the basis of their past experiences. Thus, we may talk about "long-term deprivation" which may affect one's performance in a given experimental situation.

5. The Learning of Valence: Zigler

For the purposes of the present discussion, Zigler's general perspective of social learning is separated from the content of his actual studies on social deprivation. The reason for such a separation is that, while his general perspective seems to provide a relevant framework for the discussion of SDSE, his actual research does not appropriately deal with this effect.

The present study certainly calls into question the position that social reinforcement effects are wholly explainable in terms of such drive operations as the short term deprivation and satiation of social reinforcers. Within such a position the child is viewed as a passive recipient of social reinforcers that inexorably shape his behavior. The present study suggests that the child's attitude toward the reinforcing agent must be viewed

as mediating the effectiveness of the social reinforcer being dispensed on the one hand and determining responses emitted on the other" (Berko-witz & Zigler, 1965).

Zigler's objections to what he labeled "the mechanistic approach" are even more strongly expressed in an earlier paper: "The child must be viewed as an acting agent, a thinking, feeling, motivated organism who is not indiscriminantly buffeted about by any wayward wind of experience" (Zigler, 1963a).

This statement has a propagandistic tinge to it, and naturally the child is no less active in Gewirtz's studies than he is in Zigler's studies. The issue in question is really not how active the child is, but rather the framework within which social learning is being considered. Zigler objected to Gewirtz's omission of the consideration of learning from the analysis of SDSE. He maintained (as this paper does) that the interaction of the child with a particular adult determines the effectiveness of that adult as a reinforcing agent. The emphasis is put on the way the child processes the information carried by the reinforcing stimuli, and the resulting behavior is determined by the child's learning.

Zigler objected to the generality of the deprivation effect as reported by Gewirtz and Baer. "Social-drive theory clearly generates the prediction that relative satiation effects should hold across a change in reinforcing agents between treatment and test situation" (McArthur & Zigler, 1969). The view that deprivation and satiation effects are person-specific, not readily generalizable from one experimenter to another, seems reasonable

within a social-cognitive perspective. Person specificity of SDSE is one of the major hypotheses of this study.

Turning now to the content of Zigler's studies, it must be pointed out that, even though social deprivation and satiation were used as variables in several of his studies, Zigler did not explicitly claim to suggest an explanation for the SDSE. He used as the central concept in social learning the Lewinian term valence and defined it as the reaction tendency toward or away from a particular person following a (positive or negative) interaction with that person. Satiation is just a side issue in the valence studies, but, in any event, the valence hypothesis cannot appropriately account for the SDSE; while the SDSE is basically an inverse relation between previous reinforcement frequency and subsequent reinforcer effectiveness, the valence hypothesis involves a positive relation between the earlier experience and the subsequent effectiveness of reinforcement. We will see later that Zigler's conditions are different from deprivation and satiation conditions used in other studies, availability of reinforcement in the pretest treatment being just a side effect of "a warm, pleasant and rewarding atmosphere."

It must be emphasized at this point that we do not intend to examine the adequacy of the valence hypothesis, but just assess its adequacy in explaining the SDSE. Having this in mind, we can proceed to review the major valence studies. McCoy and Zigler (1965) hypothesized that there is a positive relation between warmth and pleasantness and later reinforcer effectiveness. Subjects who had a warm, positive relationship with the experimenter

(who was "complimentary, helpful and responsive") were found to play "Marble In The Hole" significantly longer than subjects who had a neutral interaction with the experimenter, when the experimenter dispensed social approval in a fixed interval during the MITH game. This latter group played longer than a "no-interaction" group.

Berkowitz and Zigler (1965) and Berkowitz, Butterfield and Zigler (1965) subjected children to positive and negative interactions with the experimenter and tested their performance (time playing MITH) immediately and after a week's delay. The operations used to create valence are quite different from deprivation and satiation operations we have discussed thus far. In the valence studies, the subjects personally experience success or failure from the hands of the experimenter, who is either pleasant and warm (success) or unpleasant and hostile (failure). Deprivation and satiation operations involve only a quantitative manipulation of the frequency of good emissions in a neutral emotional climate with no variations in the experimenter's manner. (In a way, it seems that Zigler's dependent variable--reinforcer effectiveness--is just incidental to the more general emotional effect of like and dislike for the experimenter.) In spite of the differences in operations, Berkowitz et al. discovered that the results of the "no-delay" tests were in line with the deprivation hypothesis, and opposite to the valence hypothesis--a higher performance recorded for the negative interaction group. It was only in the delayed testing that the valence hypothesis was confirmed and the positive interaction group showed a higher performance than the negative

interaction group. The "no-delay" results were explained as reflecting a "contrast effect," a vague concept which seems to be somewhat similar to Walters' concept of arousal. Berkowitz et al. claimed the contrast effect to be independent and inhibitory to the valence effect. At any event, the confirmation of the valence hypothesis in the delayed testing could not appropriately account for SDSE, as the "no-delay" results were opposite to the valence predictions.

McArthur and Zigler (1969) separated the satiation operations from the valence operations in order to compare their relative effects. They actually claimed at one point that social drive (i.e. SDSE, E. Babad) and valence must not be "antithetical"--they may be independent determinants of reinforcer effectiveness. McArthur and Zigler used Gewirtz's (1967) deprivation and satiation operations, with two or twenty emissions of good in the ten-minute pretest treatment. Valence was previously manipulated by showing the subjects a film in which the experimenter was seen as either warm and pleasant or unpleasant and hostile toward other children. The film was used to prevent the personal experience of success or failure. The MITH test was administered by the "film" experimenter, while the pretest D- or S-treatment was given by another experimenter. The results showed a significant valence effect (higher performance for "positive" film experimenter) with neither a deprivation effect nor an interaction effect. The results were implied (but not explicitly stated, E. Babad) to indicate the superiority of the valence factor. However, such an implication is not neces-

sarily correct, for several reasons: First, even though the valence effect was statistically significant, none of the valence groups was significantly different in performance from a "stranger" (no film) group. Secondly, the pretest treatment was not administered by the testing experimenter. If the SDSE is person-specific, the treatment could not be expected to affect performance. Since Zigler criticized social-drive theory and implied person specificity, the results of this experiment cannot be generalized to all cases of deprivation and satiation.

6. The Learning of Reinforcement Value

The interpretation suggested in this paper for the SDSE emphasizes the role of cognitive variables which serve a mediational function. The relationship between frequency of reinforcement in treatment and its effectiveness in test is hypothesized to be mediated by a learning of reinforcement value. The actual D- or S-treatment is seen primarily as the opportunity to provide the child with the appropriate information necessary for finding out about the reinforcement value of the experimenter, rather than to alter motivational states.

Reinforcement value is defined in terms of the behavioral change it produces. The higher the reinforcement value, the stronger the tendency of the subject to choose a nonpreferred picture in a discrimination test when this choice is socially reinforced.

The suggested interpretation includes the assumption that reinforce-

ment value of a person's reinforcement is influenced by previous availability (frequency) of that reinforcer coming from that person. Implied in that assumption is the idea that the particular reinforcer is initially capable of reinforcing behavior and that its value can be changed following varying frequencies. The first assumption may also be restated to say that reinforcers which are easily attainable are low in value and therefore not worthy of much effort (such as choosing a less-preferred picture). Reinforcers which are difficult to obtain, on the other hand, are valuable and worth much effort. When reinforcement value is high ("deprivation"), subjects will choose the nonpreferred picture more frequently and receive more reinforcement, while "satiated" subjects will choose their favorite picture more frequently. Another derivation from this assumption is that the effect is person-specific, not readily generalizable from one person to another.

This conceptualization stresses the roles social and cognitive factors play in creating the SDSE, minimizing the role of motivational states. The interaction between the child and the reinforcing adult is very important, and during this interaction (treatment) the child learns about this particular person, his reinforcing qualities and his approach to the child. He forms the reinforcement value on the basis of these perceptions and will behave in the future in a particular way toward this adult.

Contrary to the traditional learning approaches, we suggest here putting the most emphasis on the source of the reinforcing stimuli rather than the nature of these stimuli per se. S-R approach does not give place at all

to describing the source of stimulation, and formulations usually discuss only the nature of the stimuli and the state of the receiving organism. Our approach stresses that the reinforcement comes from a particular source. As a result, this conceptualization brings in sets of concepts not present in traditional S-R formulations, such as person perception, judgment and subject-experimenter interaction. Specification of the number of good emissions is, by itself, not sufficient to describe the deprivation and satiation situation, and it must be accompanied by the description of the earlier interactions of the reinforcing person with the child.

Thus, the reinforcement value of good for the subject is not determined by the simple frequency with which it is received, but by the judgment he forms of the reinforcing agent during the treatment. The treatment seems to be an opportunity to attain the information necessary for the establishment of reinforcement value, and the D- and S-procedures could be dispensed with if the information could be transmitted to the subject in another way.

To gain a better understanding of this learning of reinforcement value, one must consider the underlying mechanisms assumed to be at work in this situation. A "satiating" person produces socially reinforcing stimuli at a high time-rate. A "depriving" person does the reverse--he emits social reinforcement at a very low frequency. Our hypothesis is that satiation is characterized by the absence of a "genuine interaction" impression. A genuine interaction contains behavioral contingencies which can be clearly

observed--the feeling that the other person's behaviors are reactions to one's actions.

It is hypothesized that the satiating person emits reinforcement at such a rate that it is almost impossible for the child to identify what there is in his own behavior which triggers such an overflow of reinforcement. Thus, the child reaches the conclusion that it is something "in" the other person which causes him to emit reinforcement at such a rate, rather than anything in the child's own behavior. Lacking the sense of contingency, the child feels that his own actions have little effect on the situation and that good is emitted regardless of what he does. As a result, the stimulus word good coming from this person does not carry a high potential for changing the child's behavior.

The picture is reversed in the case of deprivation. The depriving person's rate of good emissions is very low, leading the child to judge that the experimenter's tendency (or nature) is not to give social reinforcement. When this person does say good, the child is led to believe that it is contingent upon (and caused by) a particular action of his. In other words, the child sees the good as determined by his own actions and as indicating a genuine interaction. (In actual experimental practice, the word good is never contingent upon any specific act, but its frequency in deprivation treatments is so low that the subject cannot, in any way, test the contingencies.) Thus, this person's social reinforcement acquires a high potential to influence the child's behavior. Further implications of this notion of interaction

contingencies are dealt with in the Discussion section.

Reinforcement, Deprivation and Social Class

Although many studies in the field of social reinforcement aim at formulating general laws, many departures from generality have been reported. This section deals with social-class differences.

We will first mention several general directions taken in the literature to deal with social-class differences in socialization and early learning. One prominent direction of research in this area describes the home environment and child-rearing practices. In Education in Depressed Areas, Passow (1963) put great emphasis on these aspects, providing a very general picture of early home environment and early personal history. Ausubel and Ausubel (1963) and Deutsch (1963) described, in a little more detail, the differences in the home environment of American middle-class and underprivileged groups. Other authors focused on more specific aspects of the home environment. Gewirtz, for example, discussed the availability of social reinforcement to the low-class child (1961) with reference to the concepts "privation" and "deprivation" and the idea of maintenance level. Bernstein (1960) dealt with the verbal aspects of social interactions at home, analyzing the quality and the quantity of speech. Hess and Shipman (1956) examined the content of social interaction, concluding that low-class mothers

tend to use "status-oriented control" more frequently, while middle-class mothers show a higher frequency of "person-oriented control."

There have been a number of attempts to conceptualize social-class differences in various theoretical frameworks. Zigler and his associates (Green & Zigler, 1962; Harter & Zigler, 1968; Shallenberger & Zigler, 1961; Stevenson & Snyder, 1960; Zigler, 1961; Zigler, Hodgden & Stevenson, 1958) argued against the Lewinian hypothesis that feebleminded children have stronger barriers and therefore show more rigidity, claiming that this is a motivational issue related to social class rather than a cognitive one (i.e. having directly to do with feeblemindedness). These writers maintained that rigidity is the product of a long-term social deprivation which results in increased sensitivity to social reinforcers. The results of these studies consistently showed the greater sensitivity of feebleminded children to social reinforcement. These findings come to an even sharper focus when related to studies which separate the effects of institutionalization and feeblemindedness. Both Zigler and Williams (1963) and Stevenson and Fahel (1961) concluded that institutionalization increases the subjects' long-term deprivation, resulting in greater sensitivity to social reinforcement (both positive and negative).

Along similar lines, Rosenhan (1966) used the term alienation to deal with social-class differences in reinforcement effectiveness. According to Rosenhan, low-class children become "alienated" as the result of lack of communication with the environment, consequently they are unable to com-

prehend the demands and expectations of the environment. Rosenhan's findings showed that low-class children are more dependent on external cues and thus more responsive to both approval and disapproval.

Turning now to specific empirical research on differential effects of types of reinforcements, we must deal with several dimensions. Using Rotter's social-learning theory, Battle and Rotter (1963) and Lefcourt and Ladwig (1965) (see also, Rotter, 1966) studied the "generalized expectancy for internal versus external control of reward." Middle-class children were found to show a higher tendency to expect internal control (meaning that only one's actions determine whether he will be reinforced), while low-class children showed a higher tendency to expect external control (where reinforcement is not determined by one's actions).

Terrell, Durkin and Wiesley (1959) and Zigler and deLarby (1962) reported that, while middle-class children show a higher performance in discrimination learning when reinforced with a nontangible reinforcer, low-class children show a higher performance when a tangible reinforcer is used. Douvan (1956) and Endo (1968) claimed that tangible and intangible reinforcers are equally effective with middle-class children, while for low-class children a tangible reinforcer is more effective than an intangible one. Greenbaum, Weiss and Landau (in press) found that only a tangible reinforcer was effective in a concept-switching task, regardless of social-class membership.

Another dimension of difference was proposed by Zigler and Kanzer

(1962), who found that middle-class children perform better for correctness reinforcers (right, correct), while low-class children show a better reaction to praise reinforcers (good, fine). As an indication of a developmental interpretation for this finding, they cited Gewirtz (1954), who suggested that the effectiveness of praise reinforcers diminishes with age and is replaced by reinforcement inherent in the information that one is correct. However, Rosenhan (1966), McGrade (1966) and Rosenhan and Greenwald (1965) failed to replicate Zigler and Kanzer's findings.

Finally, Mischel (1966) reported that middle-class children show a higher readiness to delay reward, while low-class children prefer immediate (though smaller) rewards.

The experiments reported in this paper were carried out with both middle-class and low-class groups of children. Our questions regarding class difference touched on all aspects of SDSE--motivational, cognitive and social. In general, we wondered whether low-class subjects would show the predicted patterns of performance and whether there would be any differences between low-class and middle-class findings. More specifically, we asked the following questions:

1. Would social reinforcement affect the behavior of the low-class subjects at all? The reinforcer used in this study is nontangible (even though in Zigler and Kanzer's "praise" category). Would social reinforcement affect low-class subjects differently than middle-class subjects?

2. Would low-class subjects show a SDSE following D- and S-treatments? Would the expected SDSE differ in any way between low-class and middle-class groups?
3. Would the SDSE be person-specific for low-class subjects? Person specificity requires a great deal of differentiation and fine distinctions between aspects of the situation.
4. Would the low-class children react at all to the verbal informational input? Would the informational input interact with the actual D- and S-treatments as predicted? Would the information x treatment interaction take different patterns for low- and middle-class groups?

Overview of the Three Studies

Three experiments are reported in this paper, studying two major aspects of the suggested social-cognitive interpretation of SDSE. The two general hypotheses are:

1. The SDSE is person-specific, not readily generalizable to other experimenters.
2. Appropriate informational input, transmitted directly and not by way of actual dispensation of reinforcement, will strongly affect performance. The information is expected to modify the effect of

actual treatments on performance.

In all three experiments the subjects received either a D- (deprivation) or a S- (satiation) treatment, similar to those of Gewirtz (1967). Children were asked by the experimenter to busy themselves for a few minutes while she finished some paper work. During the ten-minute treatment period, the experimenter emitted the stimulus word good either two ("deprivation") or twenty ("satiation") times, noncontingent upon specific activities of the subjects. The subjects were then given a simple discrimination task in which they were to choose one of two pictures on each card. The nonpreferred choice (in base-line trials) was reinforced with good and the dependent variable was the number of reinforced responses in the 75-trial test.

In the first experiment, half the subjects received a deprivation treatment and the other half a satiation treatment. These groups were further divided so that half the children were tested by the same experimenter who administered the treatment, while the others were tested by another, unknown, experimenter. It was predicted that, while the performance (number of reinforced responses in test) of the Same-E groups would reproduce the SDSE pattern, this effect would disappear in the Other-E condition, with no difference between D- and S-groups.

In the second experiment, each child received two treatments (either "deprivation" or "satiation") from one experimenter and was treated on the third day by a second experimenter. This treatment was immediately followed by the discrimination task, administered by the original first experi-

menter. It was thought that this experiment would contrast the children's immediate "motivational" state, as determined by the frequency of reinforcement in the immediate pretest treatment with the reinforcement value of the first experimenter, based on the two previous interactions ("remote treatments") with her.

In the third experiment, the subjects were given information about the experimenter prior to meeting her. The information was that the experimenter said good occasionally, and that she said it either "many, many times" (satiation-equivalent condition) or "very few times" (deprivation-equivalent condition). The subjects then received a (D- or S-) treatment from the experimenter, followed by the discrimination test. The treatment was either compatible or incompatible with the earlier informational input. We expected to find both an information effect and an information x treatment interaction effect.

METHOD

Subjects

Subjects in the three studies reported in this paper were 251 children of upper middle class and low class in six schools in North Carolina. All subjects were in the third and fourth grades, ages ranging from 8.5 to 11 years. Fifteen of the 251 subjects were eliminated from the analysis as they did not have an opportunity to be reinforced in the discrimination task. The remaining 236 subjects were equally divided between the two social-class groups.

All middle-class subjects were students of two private day schools in Durham, N. C. Almost all parents were professionals (either executives or academics) who owned their own homes and had relatively high incomes. The low-class children consisted of two groups. Ninety children (subjects in the first and second experiments) attended special classes (located in three schools) of an experimental program for culturally deprived children. These 90 children were classified by EIP (Education Improvement Program) officials as "underprivileged," according to family income, education, type

of residence, and several other indices. The remaining 28 low-class subjects (third experiment) were students in a neighborhood school with a homogeneous low-class population. Two-thirds of the families in this school were welfare recipients, one parent was absent in more than half the families, the majority of families lived in a public housing project, and the average income was very low.

Both social-class groups included black and white children, although the majority of the middle-class group were white, while the majority of the low-class group were black. Unfortunately, we were unable to analyze the result dividing the group according to race, as the distributions were asymmetrical and we were not able to have adequate control groups within the social-class groups.

Deprivation and Satiation Treatments

"Deprivation" and "satiation" were two levels of an independent variable which was used in all three experiments.

Each subject was brought individually to the experimental room where he met the experimenter, a woman in her early twenties whom the subject had never seen before. (In the first experiment, a male in his mid-twenties served as experimenter for half of the subjects.) The room was, in most cases, a vacant classroom, and the subject was seated at a table in the corner facing the wall. On the table were several books and magazines, and a pack of orange cards. The experimenter, who sat next to the subject, said:

"I want to show you a game with these cards, but first I have to finish some paper work. You can read these books and magazines while I work." During the next ten minutes the experimenter pretended to be busy with her paper work, but she emitted the word good either two ("deprivation") or twenty ("satiation") times. The experimenter took care that the word was not contingent upon any specific activity of the child, and voiced the good in a slightly impersonal manner, avoiding eye contact with the subject. In the deprivation treatment, the stimulus word was emitted at the 2.5- and 7.5-min. time marks. In the satiation treatment, the word was emitted approximately every 30 seconds. (An exception was the middle-class group of the first experiment, where the stimulus word was emitted only 16 times in the satiation treatment at fixed intervals of approximately 35 seconds.)

Remote and Immediate Treatments

These treatments were given in the second experiment. Each subject received two remote treatments, not followed by the discrimination test. It was only on the third day that each subject received the immediate (D- or S-) treatment which was followed by the discrimination test. The remote treatments were similar to deprivation and satiation treatments in setting, number of stimulus presentations, and the manner of their presentation. The only difference was that the subjects were asked to perform certain tasks rather than busy themselves with books and magazines. In the first remote treatment, each subject was asked to select a book from the table and tell

stories about the pictures. The subject could either read aloud or invent the stories. In the second remote treatment, the subjects were asked to draw pictures on subjects of their own choice. Also available was a plastic toy with handles, which could be manipulated.

Each subject received the stimulus word good either two or twenty times in each of the remote treatments. The number was consistent in both treatments. The experimenter refrained from eye contact with the subject, and her good was dispensed noncontingent upon any specific behavior of the child. Emission was postponed for a few seconds if a specific behavior (such as looking up or turning a page) took place when it was time to say good.

The immediate treatment was given on the third day by another experimenter, following the procedure of deprivation and satiation treatments. The number of good emissions in the remote and immediate treatments was either compatible or incompatible.

Information Treatments

Variations in informational input were levels of an independent variable used in the third experiment. Consistent information regarding the "reinforcing nature" of the experimenter was given to the subjects by their teachers and by the person who brought them from their classrooms to the experimental room.

The teachers told their classes: "During this week each one of you will participate in a game with a lady from Duke University. This lady is

interested in finding out about games that children play. She has already been in other schools and now she has come to our school. Each one of you will have the chance to play the game with her. Before you go, I want to tell you a little bit about what will happen. The lady will show you a game with cards. The cards have pictures on them, and she will show you what to do with the pictures. I also want to tell you something about this lady.

('Few' condition:) She says good during the game, but she usually says it only very few times. She says good during the game, but she will not say it many times. ('Many' condition:) She says good during the game, and she says it many, many times. The lady will say good many, many times."

(Each teacher gave either "Few" information or "Many" information, but never both.) The "Few" condition was considered to be a functional equivalent of deprivation, while the "Many" condition was considered to be the functional equivalent of satiation.

On the way from the classroom to the testing room, the person who accompanied the child (not the experimenter) repeated the information and made sure (through brief questioning) that it was well remembered. On the way back to the classroom after the testing had been completed, the same person made an informal inquiry and recorded the subjects' descriptions of the experimental situation.

Discrimination Test

The number of "correct" responses in this task was the dependent

variable in all three studies.

Seventy-eight orange cards (8.5 x 5.5 inch) were used in the test, two pictures on each. The pictures on each card showed (in randomized positions) one plant and one animal. The instructions were as follows: "On each card you will find two pictures. I want you to choose one of them, and point to the one you choose. O.K.? Let's start." The first three cards were used to determine the subject's choice, and the picture chosen in the minority of these trials was reinforced with good from the fourth trial on. The number of "correct" responses, i.e. selections reinforced by the experimenter, was the dependent variable in this study, and its maximum was 75. (When we later mention "higher performance," its meaning is "a greater number of reinforced responses.") Fifteen of the 251 subjects were dropped from the analysis since they did not receive any reinforcement in the test. These subjects chose systematically one type of picture throughout the 78 trials, and they never found out that the opposite choice could have profitted them with good emissions.

Except for the Same-E groups in the first experiment, the experimenters were never informed what treatment the child had been given by the other experimenter or the type of information he had received. Moreover, the specific research hypotheses were not clearly disclosed to the experimenter until after the data had been collected.

Summary of Conditions

For later reference by the reader, Table 1 summarizes the design and conditions of the various experiments.

As Table 1 indicates, the identity of the experimenter was an independent variable in the first experiment, and children were tested either by the treating experimenter or by a new, unknown one. (The notations E_1 and E_2 do not refer to specific persons, but rather to the fact that a particular experimenter saw the child more than once. The particular woman who was E_1 for one subject could have been E_2 for another subject.) In the second experiment, the test was administered by the experimenter who administered the remote treatments, while the pretest immediate treatment was administered by the other experimenter. In the third experiment, the subjects were exposed to one experimenter only.

Table 1
Details of the Experimental Series

Experiment No.	Deprivation and Satiation Treatment	Remote and Immediate Treatment Information	Tested by	No. of Cells	No. of Subjects in Cell	Social Class	Total N
1	2, 16 ^a (E ₁)		E ₁ or E ₂ ^b	4	10	M	40
1	2, 20 (E ₁)		E ₁ or E ₂	4	10	L	40
Control			E	1	10	L, M ^c	20
2	2, 20 (E ₂)	2, 20 (E ₁)	E ₁	4	10	L, M	80
3	2, 20 (E)	"Few," "Many"	E	4	7	L, M	56

a. The numbers refer to the number of good presentations in treatment.

b. The identity of the experimenter was a second independent variable; it was either the same (treating) experimenter or another, unknown experimenter.

c. "L, M" refers to the administration of the study in both middle- and low-class groups. The number of cells is thus doubled.

PERSON SPECIFICITY

First Experiment--"Same" and "Other" Experimenters

Middle Class

The presentation of the first experiment will be divided into two parts, one dealing with the middle-class group and the other with the low-class group. For purposes of exposition, the division of this experiment into two parts allows us to deal first with the question of person specificity alone and only later introduce social-class differences. Another reason for this division is "historical"--this experiment was the first in the series, while its replication with underprivileged children followed much later. A third reason is that the satiation treatments were not identical in the two parts, sixteen presentations of the stimulus word good given in the first part and twenty in the second.

The first experiment deals with the question of person specificity. It asks whether SDSE will be found only if the same experimenter administers both the satiation-deprivation treatment and discrimination test or the same

effect will be found following deprivation and satiation treatments with another or any testing experimenter. The suggested learning interpretation of SDSE stresses the importance of the specific interaction between the child and a particular experimenter, proposing that this interaction (the treatment) provides the child with the opportunity to acquire his expectations regarding the reinforcing value of this adult's reinforcement. Accordingly, it is predicted that the deprivation-satiation effect is person-specific, with no differences expected to be found between deprivation and satiation groups when the testing experimenter is not the one who administered the pretest treatment.

Procedure. Each subject was taken from his classroom by the experimenter and brought to the experimental room. Care was taken to call the subjects in class periods when they were not physically active (e.g., participating in physical education). Two graduate students served as experimenters, a male and a female in their mid-twenties. (Two undergraduate female students were used in the other experiments.) The children of a given classroom were exposed to one experimenter only and did not suspect the existence of another experimenter.

The subjects were given either a "deprivation" or a "satiation" treatment as described on page 31. The only change from the general procedure was that the satiation group received only sixteen, instead of twenty, emissions of good in this part. After the 10-min. treatment was over, the experimenter collected his/her papers and stood up. In the Other-E condition

the experimenter said: "I must finish my paper work, but since it takes so much time and I hate to keep you waiting, I shall call someone else to show you the game with the cards." The experimenter then left the room, and a few seconds later the other experimenter entered the room and administered the discrimination test to the child (see description on page 34). In the Same-E condition the experimenter said: "I shall go out for a minute and then come back and show you the game with the cards. Please sit here and wait." The experimenter then left the room, reentered after a few seconds, and administered the test as described.

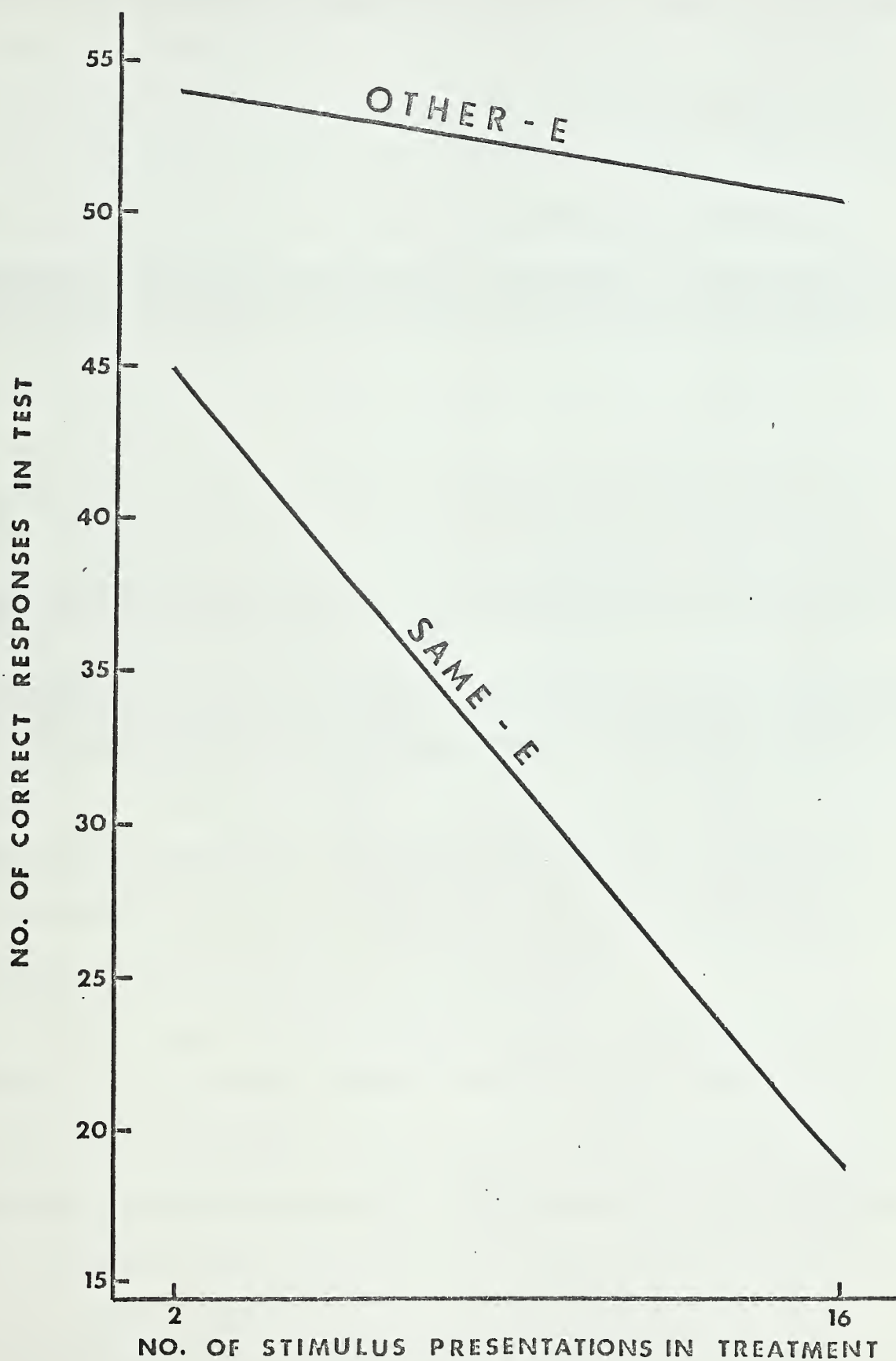
The experimenters were acquainted with the research hypotheses, and care was taken that in the Other-E condition they did not know which treatment had been administered to the child. Nothing could be done regarding the Same-E condition, but it must be stated that both experimenters were well acquainted with the literature on experimenter bias. (In all other studies, including the second part of this experiment, the experimenters were unacquainted with the hypotheses of the research and the experimental conditions.)

Results and discussion. The number of reinforced ("correct") responses in the 75-trial test for the four experimental groups was subjected to an analysis of variance. As Table 2 shows, both main effects were significant at the .01 level, and the interaction effect was significant at the .05 level. The pattern of the results is shown in Fig. 1. Attending first to the Same-E groups, one sees a typical deprivation-satiation effect (high per-

Table 2
Analysis of Variance of Test Scores for Middle-Class
Subjects in Experiment 1

Source	df	MS	F	p
Treatment (Deprivation-Satiation) (A)	1	2176	7.78	<.01
Experimenter (Same-Other) (B)	1	4141	14.81	<.01
A x B	1	1266	4.53	<.05
Error	36	280		

Fig. 1. Test Performance of Groups in the Four Experimental Conditions (Experiment 1, Middle-Class Subjects).

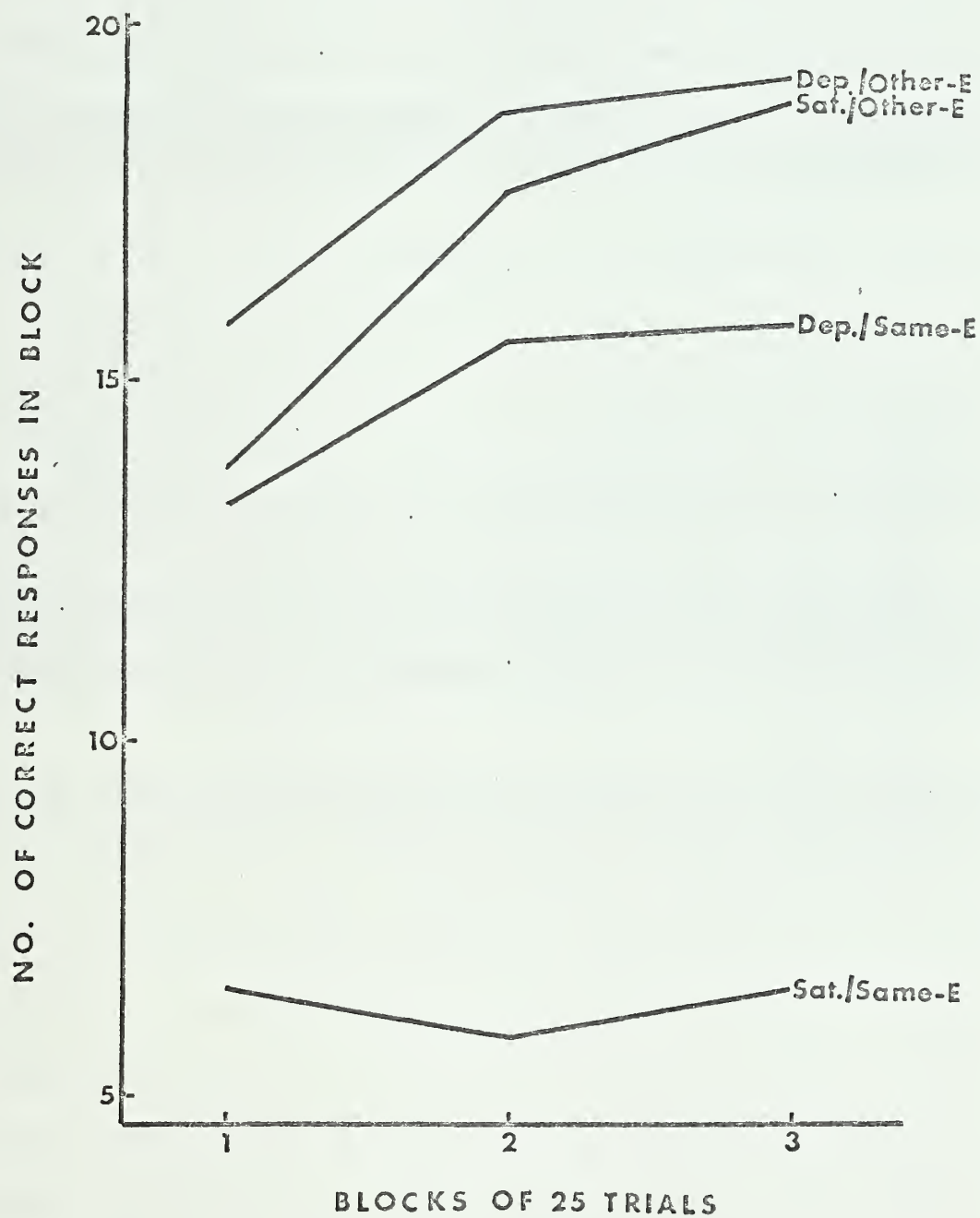


formance for D-groups, lower performance for S-groups). The difference between the two groups is substantial, slightly over 26 responses out of 75 trials. The picture is different for the Other-E condition, where the difference between the deprivation and satiation groups dropped from 26 responses to a mean difference of about 2.5 responses. This is in line with the specificity hypothesis, which predicts that the SDSE will be minimized when experimenters are switched. Another finding is revealed in Fig. 1--the higher performance of the Other-E groups in comparison with the Same-E groups. This effect is the result of the appearance of the new experimenter on the scene, in accord with ideas regarding the effects of novelty on performance (e.g., Berlyne, 1960).

The difference in slope between the Same-E and Other-E gradients in Fig. 1, supported by the significance of the interaction effect in Table 2, is interpreted to indicate that SDSE is person-specific, not highly generalizable from one experimenter to another. Were the effect a reflection of motivational differences alone--differences in levels of social drive--one would expect the functions in Fig. 1 to be parallel.

Further support for the learning hypothesis can be found in the trend analysis. Not only did the difference between D-groups and S-groups drop sharply when experimenters were switched, but the trends of the Other-E groups are quite different from those of the Same-E groups. (Test results were divided into three 25-trial blocks for trend analysis.) It can be seen in Fig. 2 that the two Other-E groups showed similar trends, while the

Fig. 2. Trends in the Test Performance of the Four Experimental Groups (Experiment 1, Middle-Class Subjects).



trend of the Satiation/Same-E group was very different from that of the Deprivation/Same-E group, both different from the Other-E trends. If one considers the relative standing of the four groups in the third block only, he sees that the interaction effect is even stronger than in Fig. 1. The trend analysis revealed a significant effect of blocks ($F = 24.35$, $p < .01$) with a strong linear component ($F = 44.3$, $p < .001$) and a weaker quadratic component ($F = 4.6$, $p < .05$). The interaction of the experimenter conditions with the blocks was highly significant ($F = 7.97$, $p < .01$), indicating that the Same-E and Other-E conditions resulted in different trends. The triple interaction (Blocks $\times$ Treatment $\times$ Experimenter) is also highly significant ($F = 23.19$, $p < .01$), probably reflecting the fact that the "deprivation" and "satiation" groups in the Same-E condition showed different patterns, in addition to the differences in trends between the two experimenter conditions.

Since both boys and girls served as subjects and the two experimenters were also not of the same sex, an analysis of variance to evaluate the effects of sex differences was carried out. The results showed no significant sex effects, and all F ratios (sex of S, sex of E, and S $\times$ E interaction) were very low (below $F = 1.20$). The only sex-related finding which reached statistical significance was the interaction of the treatment with the sex of the child ($F = 4.33$, $p < .05$), girls performing lower than boys under S-treatment but higher under D-treatment. It would seem that this pattern of performance can be explained on the basis of the popular notion that grade-

school girls are more dependent on social approval, while boys are more independent or even counterdependent. As a result, girls may be more sensitive to social reinforcement, reacting more strongly to both deprivation (higher than boys) and satiation (lower than boys) treatments.

In addition to the four experimental groups, a control group of ten subjects was tested without receiving any S-D treatment. Representing "normal" performance on the discrimination task, this group could help determine whether the S- and D-treatments really resulted in decreased and increased performance. The mean number of correct responses for the control group was 39.1, about five points below the mean of the Deprivation/Same-E group and twenty points (significant at the 5% level) above the mean of the Satiation/Same-E group. Thus, the decrease in performance following a high frequency of good was almost four times greater than the increase following a low frequency. The "satiated" nature of the Satiation/Same-E group can also be seen in Fig. 2, its trend being quite different from the other groups.

Another interesting observation can be made on the basis of Fig. 2. Unlike the middle-class S-group, which did not increase the frequency of selecting the less preferred picture after the first block, the D-group increased the frequency of "correct" responses even though they received, on the average, more than thirteen social reinforcements in that trial block. This difference suggests that the stimulus word good may have a quite different meaning in treatment and test, and its frequency could not simply be

counted mechanically to account for "deprivation" and "satiation."

Low Class

As mentioned earlier, the replication of the same experiment with a group of underprivileged children was carried out some months after the findings of the first part were available. The main question was whether the patterns found in the first part could be generalized across social-class groups. From the literature on social-class differences, one could well question the generality of the relationships, since a social, nontangible reinforcer was used and the required distinctions posed by our experimental conditions were quite delicate. Using isolation techniques to create deprivation, Endo (1968) failed to find a deprivation effect in low-class groups.

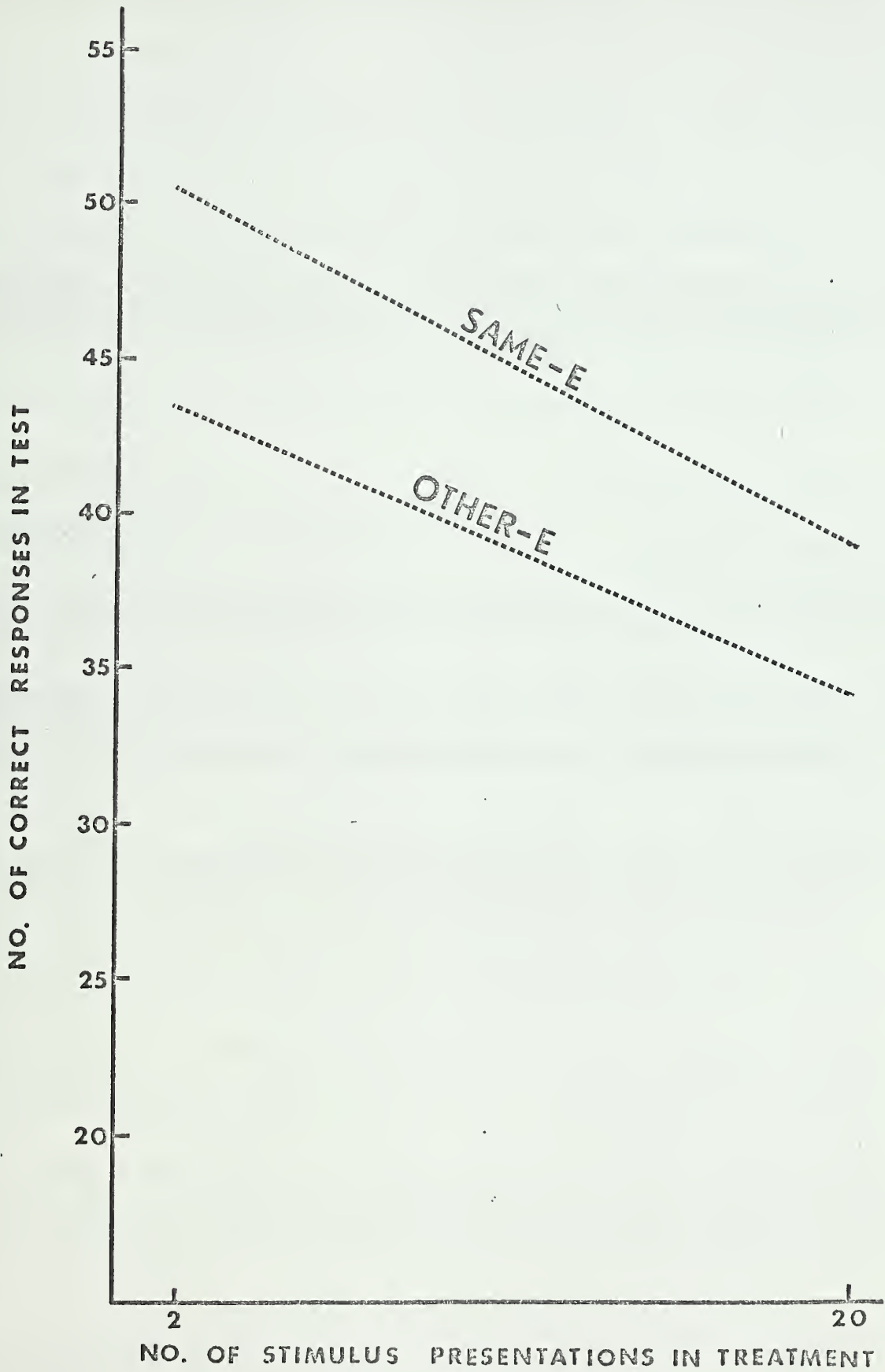
Procedure. The procedure was essentially identical to that in the first part, but with two minor changes. The number of good emissions in the S-treatment was increased to twenty to simplify the interval schedule, and the experimenters were two female undergraduates (who were unacquainted with the research hypotheses).

Results and discussion. The number of reinforced responses in the 75-trial test for the four experimental groups was subjected to an analysis of variance, presented in Table 3. None of the effects reached statistical significance, even though the treatment effect approached the 10% level. The pattern of the four groups is shown in Fig. 3. One can see a general lack of differentiation among the groups. However, the pattern reflects a

Table 3
Analysis of Variance of Test Scores for Low-Class
Subjects in Experiment 1

Source	df	MS	F	p
Treatment (Deprivation-Satiation) (A)	1	1030	3.19	n. s.
Experimenter (Same-Other) (B)	1	331	1.02	n. s.
A x B	1	13	< 1.00	n. s.
Error	36	323		

Fig. 3. Test Performance of Groups in the Four Experimental Conditions (Experiment 1, Low-Class Subjects).

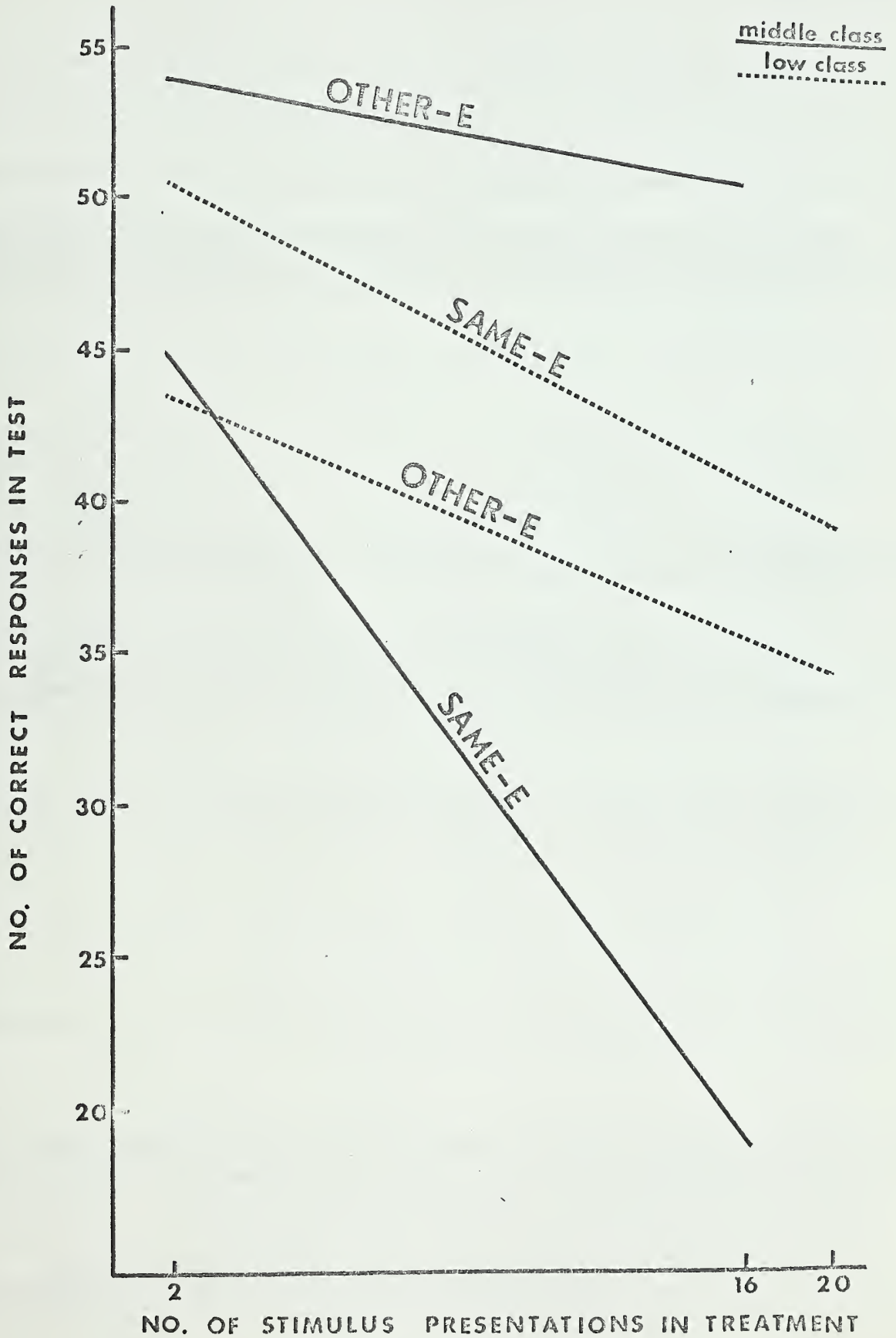


trend in line with the SDSE, the performance of D-groups being higher than that of the S-groups. On the basis of the weakness of D- and S-treatments to produce marked effects, it is perhaps not surprising that the more delicate operation of changing experimenters had an even weaker effect on performance. The slopes of the Same-E and Other-E gradients are almost parallel, with no apparent flattening in the angle's steepness. Also contrary to the results of the first part is the fact that the underprivileged children reacted to the novelty of the appearance of the new experimenter in decreased, rather than increased, performance.

To accentuate the class differences, Fig. 4 combines the two parts of this experiment. The limited range and lack of differentiation of the low-class performance compared to the middle-class groups can be seen very clearly. The comparison of the Same-E groups (deprivation-satiation with no novelty) shows a stronger effect for the middle-class groups, even though the low-class groups did also show a trend toward a difference in performance between low and high frequency of previous reinforcement. The general level of performance of the low-class Same-E groups is higher than that of the middle-class groups, possibly indicating greater (even though undifferentiated) response to social reinforcement. (An analysis of variance of the Same-E groups reveals, besides the significant treatment effect, a social-class effect [$F = 5.85$, $p < .025$], reflecting the higher performance of the low-class groups.)

As in the first part, we also tested a control group of ten low-class

Fig. 4. Test Performance of Low- and Middle-Class Groups in the Four Experimental Conditions (Experiment 1).



children without subjecting them to any treatment. This group had a mean of 42.9 reinforced responses in the test, higher, but not significantly, than the 39.1 mean of the middle-class control group. This mean again falls between the D- and S-groups, although the differences are much smaller this time. However, the control group's mean is now closer to the satiation mean, leading to the conclusion that the more influential treatment was the "deprivation" treatment, unlike the "satiated" nature of the middle-class pattern. Thus, we may speculate that the treatments do not have the same effect on both social-class groups: they readily produce a satiation-like effect in middle-class subjects and a deprivation-like effect on low-class groups. In light of knowledge regarding the long-term social deprivation of underprivileged children, this is not surprising.

The trends of the four low-class groups when the 75-trial test is divided into three 25-trial blocks is presented in Fig. 5. Probably the most striking feature is the similarity among the four trends, and the absence of a different trend on the part of the Satiation/Same-E group. The Figure reflects again the lack of differentiation which we have already noted.

An analysis of variance which includes both social-class groups is presented in Table 4.¹ The results accentuate and recapitulate the conclusions

1. This analysis is somewhat illegitimate, as the S-treatment consisted of 16 good's in the first part and 20 in the second, but the two were treated in the analysis as a uniform "satiation" operation. Gewirtz's (1967) results somewhat justify this decision. He reported that any treatment with more than 16 good's results in equal performance in test. Asymptotic "satiation" performance is reached at 16 stimulus presentations.

Fig. 5. Trends in the Test Performance of the Four Experimental Groups (Experiment 1, Low-Class Subjects).

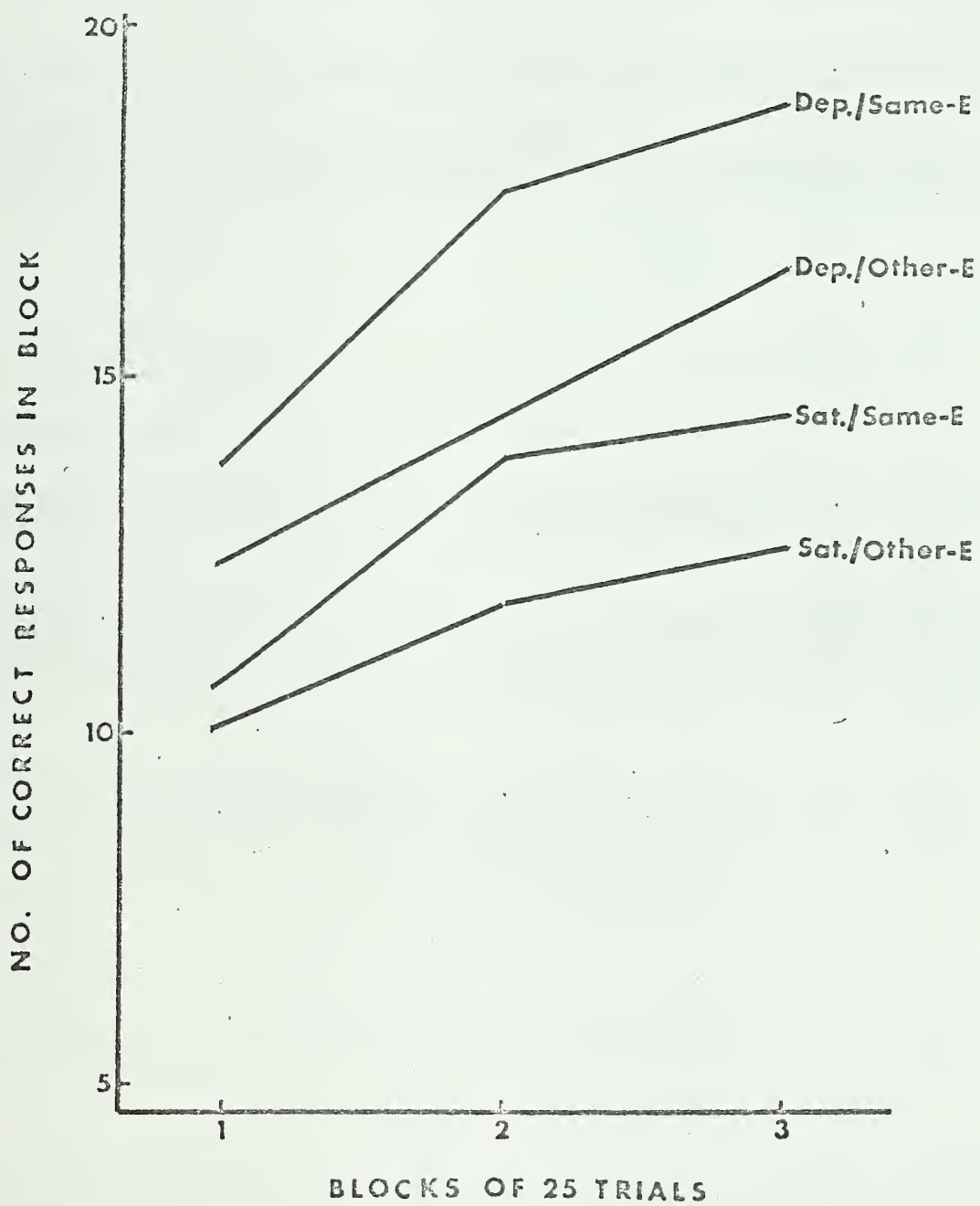


Table 4

Analysis of Variance of Test Scores for All
Subjects in Experiment 1

Source	df	MS	F	p
Treatment (Deprivation-Satiation) (A)	1	3100	11.25	<.01
Experimenter (Same-Other) (B)	1	1066	3.87	<.10
Social class (Low-Middle) (C)	1	0	< 1.00	
Sex of subject (D)	1	84	< 1.00	
A x B	1	769	2.79	<.10
A x C	1	106	< 1.00	
A x D	1	42	< 1.00	
B x C	1	3406	12.36	<.01
B x D	1	51	< 1.00	
C x D	1	168	< 1.00	
A x B x C	1	510	1.85	
A x B x D	1	289	1.05	
A x C x D	1	1693	6.14	<.05
B x C x D	1	22	< 1.00	
A x B x C x D	1	1711	6.21	<.05
Error	64	276		

we have reached thus far. The two strong effects are associated with treatment and novelty. The treatment effect (A) is highly significant, reflecting the overall higher performance of groups given a low frequency of reinforcement. The strongest effect is the interaction of experimenter conditions and social class ($B \times C$), denoting the fact that the introduction of a new experimenter increased middle-class performance but decreased low-class performance.

Finally, a comment on sex differences. We have noted earlier that middle-class girls show a higher sensitivity to social reinforcement. This effect is reversed in the low-class group, girls performing lower than boys in D-treatment and higher in S-treatment (although low-class differences are generally smaller in this experiment). We have observed the low-class girls to be more docile and timid, while the boys seemed more active and outgoing and tried to strike up conversations with the experimenters. Our speculation is that being less anxious in this situation, the boys may have been more sensitive to the experimental conditions. We must also remember that the introduction of a new experimenter inhibited low-class performance, a further indication of the feeling of strangeness and anxiety we assume to be operative.

In summary, the first experiment yielded the following results:

1. A general Social Deprivation-Satiation Effect.
2. The introduction of a new experimenter (novelty) increased middle-class performance and decreased low-class performance.

3. The SDSE was person-specific for middle-class children, but, to the extent that it appeared in low-class children, it was not person-specific.
4. Compared to control groups, S-treatment was more influential on middle-class performance and D-treatment on low-class performance.
5. In comparison with middle-class performance, low-class performance was constricted and less differentiated.
6. While middle-class girls were more sensitive to the experimental conditions than the middle-class boys, the effect was reversed for the underprivileged group.

Second Experiment--"Remote" and "Immediate" Treatments

This experiment was designed to further test the person specificity hypothesis. Rather than introducing a new experimenter for the testing stage, the subjects of this experiment received treatments from both experimenters in an attempt to determine the degree of person specificity. The experiment was designed so that a generalized response could be distinguished from a more individualized, person-specific one. Person specificity was conceived as a continuum, with varying degrees of generalization across experimenters, and we could evaluate relative degrees of specificity.

The subjects first received two treatments from one experimenter

(E_1) and were treated on the third day by another experimenter (E_2), this treatment being immediately followed by the discrimination test administered by E_1 . The treatments administered by E_1 and E_2 were either compatible or incompatible in regard to the frequency of dispensed social reinforcement.

As mentioned, the possible range of results could be viewed as representing a continuum, with test performance influenced only by the acquired expectation for the testing experimenter (E_1) at one end and test performance influenced by one's immediate state (as determined by the immediate treatment, administered by E_2) only at the other end. Since the effects of these two independent variables may well interact, we did not expect the results to fall at either end of this continuum.

Thus, all groups in this experiment were subjected to three treatment sessions, two administered on Days 1 and 2 by E_1 (labeled "remote treatments") and a third administered by E_2 immediately preceding the test ("immediate treatments"). The four groups are symbolized as follows: SS+S (both remote and immediate S-treatments), SS+D (S-remote treatments and D-immediate treatment), DD+D (both remote and immediate D-treatments), and DD+S (D-remote treatments and S-immediate treatment). SS+S and DD+D are the "compatible" groups, while SS+D and DD+S are incompatible, the third treatment being opposite in frequency of good's to the previous two.

We may now examine the possibilities for patterns of results and their meaning. If SDSE is totally person-specific, performance will be influenced

only by the remote treatments, since those are administered by the testing experimenter. The immediate treatment, administered by E₂, should then have no effect whatsoever on test performance. The expected pattern is therefore:

$$[(DD+S) = (DD+D)] > [(SS+S) = (SS+D)]$$

On the other hand, if SDSE is not person-specific, and totally influenced by one's current motivational state, the immediate treatment would be crucial, with no effect whatsoever of the remote treatments. The expected pattern is then:

$$[(DD+D) = (SS+D)] > [(DD+S) = (SS+S)]$$

However, as we said, both extreme possibilities are quite unlikely to occur, and some degree of interrelatedness between remote and immediate treatments must be expected. The third treatment is thus hypothesized to be judged on the basis of the expectation the subject acquired in the two remote treatments. The expected patterns are therefore:

$$(DD+D) > (DD+S) \quad (\text{the latter showing } \underline{\text{decreased}} \text{ performance})$$

$$(SS+D) > (SS+S) \quad (\text{the former showing } \underline{\text{increased}} \text{ performance})$$

These last patterns reflect generalization across experimenters. The more person-specific the effect is, the less generalization should occur. Thus, the difference between DD+D and DD+S (and similarly the difference between SS+D and SS+S) will (inversely) reflect the degree of person specificity.

Regarding social-class differences, we expected middle-class subjects to show a higher degree of differentiation and person specificity than the low-

class subjects, whom we expected to be influenced more by the immediate treatment.

Procedure. The subjects were taken two at a time from their classroom and brought to the experimental room. All experimental sessions took place in a mobile testing unit which contained two standard testing rooms. In the room the subject met E_1 , who administered the first "remote treatment." After the 10-min. treatment was over, the subject returned to his classroom. The same procedure was followed the next day, each subject being given the second remote treatment. Either two or twenty presentations of the stimulus word good were made in each of the remote treatments, consistent on both days. On the third day each subject was told on the way to the mobile testing unit that "today you will be in the other office," where he met E_2 , who administered the "immediate treatment." This treatment followed the procedure of the Other-E D- and S-treatments. After the 10-min. period was over, E_2 left the room and E_1 entered and proceeded to administer the discrimination test.

The experimenters were female undergraduate students who were not acquainted with the specific research hypotheses and were not told which treatment any subject had received from the other experimenter.

Results and discussion. The mean number of reinforced responses in the 75-trial test was subjected to three analyses of variance. The first (Table 5) analyzed the low-class performance only; the second (Table 6), middle-class performance; and the third (Table 7) combined both groups,

Table 5
Analysis of Variance of Test Scores for Low-Class
Subjects in Experiment 2

Source	df	MS	F	p
Remote treatments (2 days) (A)	1	65	<1.00	
Immediate treatment (3rd day) (B)	1	2544	11.56	<.01
Sex of subject (C)	1	1404	6.38	<.05
A x B	1	714	3.25	<.10
A x C	1	141	<1.00	
B x C	1	632	2.87	
A x B x C	1	0		
Error	32	220		

Table 6
Analysis of Variance of Test Scores for Middle-Class
Subjects in Experiment 2

Source	df	MS	F	p
Remote treatments (2 days) (A)	1	601	1.53	
Immediate treatment (3rd day) (B)	1	442	1.13	
Sex of subject (C)	1	1946	4.96	<.05
A x B	1	1	<1.00	
A x C	1	164	<1.00	
B x C	1	4	<1.00	
A x B x C	1	497	1.27	
Error	32	393		

Table 7

Analysis of Variance of Test Scores for All
Subjects in Experiment 2

Source	df	MS	F	p
Remote treatments (2 days) (A)	1	530	1.73	
Immediate treatment (3rd day) (B)	1	2554	8.33	<.01
Sex of subject (C)	1	22	<1.00	
Social class (D)	1	572	1.87	
A x B	1	378	1.23	
A x C	1	304	<1.00	
A x D	1	135	<1.00	
B x C	1	266	<1.00	
B x D	1	432	1.41	
C x D	1	3328	10.86	<.01
A x B x C	1	245	<1.00	
A x B x D	1	336	1.10	
A x C x D	1	0	<1.00	
B x C x D	1	370	1.21	
A x B x C x D	1	252	<1.00	
Error	64	306		

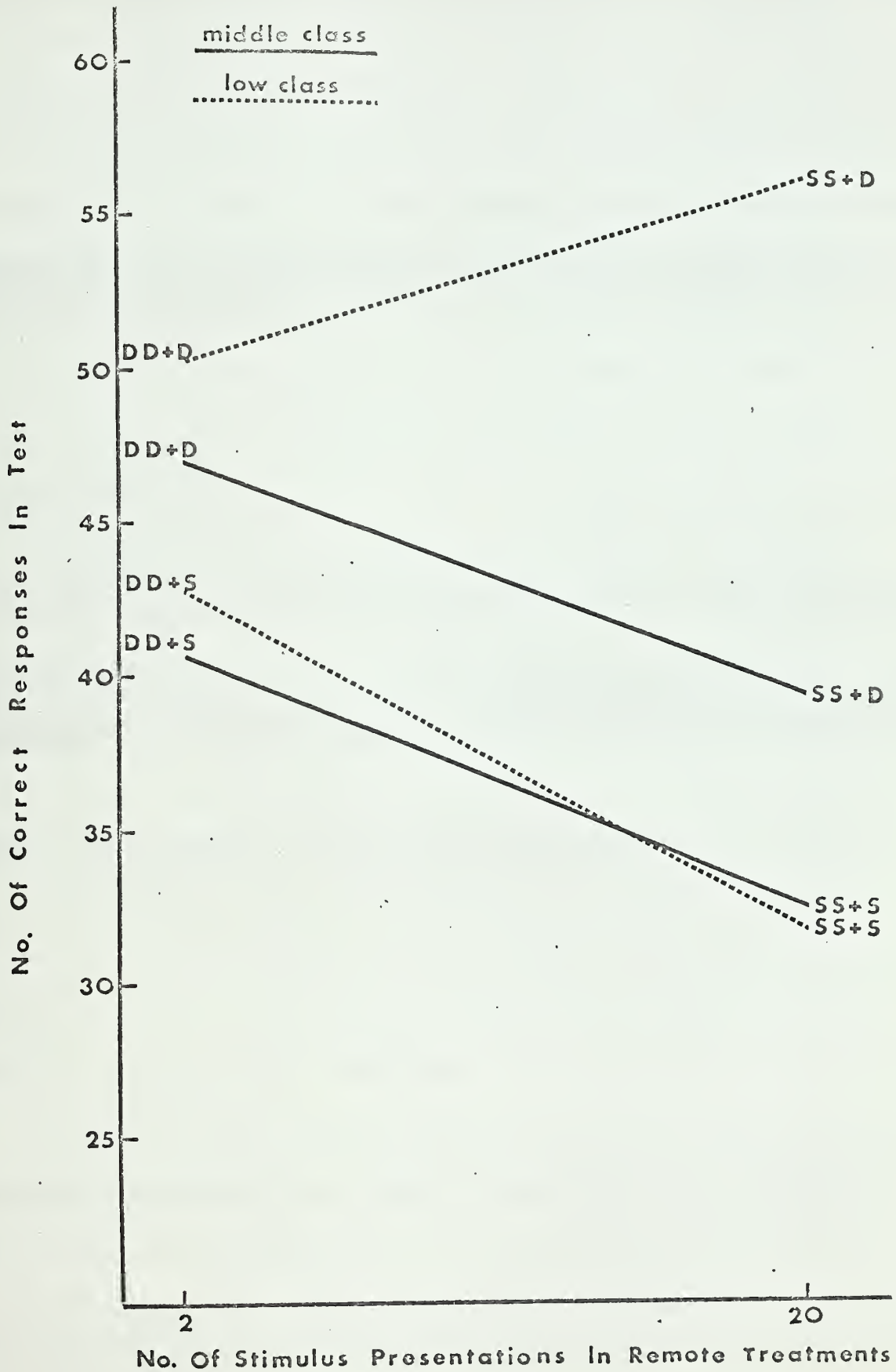
social class being an additional factor. The mean performance of the eight experimental groups is presented in Fig. 6.

Surveying first the results of the low-class groups, one can see the strong effect of the immediate treatment on test performance. The groups who received a low frequency of reinforcement in the immediate treatment gave a higher number of "correct" responses in the test than the groups who received a high frequency of good's in that treatment. The effect of the interaction between the remote and immediate treatments is significant at the 10% level, and (as Fig. 6 shows) it reflects the very high performance of the SS+D group (compared to SS+S). This indicates that the low-class subjects generalized across experimenters, reacting with increased performance to the decrease in the frequency of good's (seemingly with little regard to the identity of the reinforcing person). The difference between SS+D and SS+S (hypothesized to reflect increase in performance following the immediate D-treatment) is much greater than the difference between DD+D and DD+S (thought to reflect a decrease following the immediate S-treatment), supporting again the conclusion that underprivileged children are more sensitive to "depriving" changes in frequency of reinforcement.

Also significant was the "sex of subject" effect, reflecting again the relatively higher performance of boys.

Turning now to the results for the middle-class groups, one can see that neither the remote nor the immediate treatments resulted in decisive effects. In both cases the mean of D-treatment is somewhat higher than the

Fig. 6. Test Performance of Low- and Middle-Class Groups in
Four Combinations of Remote and Immediate Treatments.



mean of S-treatment groups, but the mean differences are small with no interaction between the types of treatment. The results do not reflect absolute person specificity, but neither do they show a generalization across experimenters. The combination SS+D resulted in performance similar to the combination DD+S, the latter (in spite of the immediate treatments) even being a few points higher.

The only significant effect in the middle-class analysis is the "sex of subject" effect, girls showing a higher performance than boys, contrary to the low-class finding.

The combined analysis of middle- and low-class groups reveals a statistically significant effect of the immediate treatment. This effect combines the significant low-class effect and the middle-class weak trend toward such an effect. The remote treatments did not result in a significant effect, due probably to a combination of the low-class generalization across experimenters with the weak person specificity found for middle-class subjects. The second significant effect in that analysis is the interaction of sex and social class, middle-class girls performing higher than boys and low-class children showing the reversed effect. This seems to be in line with our earlier interpretation of sex differences.

In evaluation of the setting conditions of this experiment, we are forced to recognize that the use of the mobile testing unit does not seem very wise. While in the first experiment care was taken to make sure that the subjects would not know about the existence of another experimenter, the subjects of

this experiment were brought to the testing unit in pairs, so they knew that two experimenters were working in parallel. When they were brought to the "other office" on the third day, they expected to meet another experimenter. This would seem to enhance the tendency to generalize across experimenters and view both as part of one total experience. Thus, had these setting conditions been different, the middle-class children might have shown stronger person specificity, and the low-class children less generalization across experimenters.

A further problem was the high level of excitement produced by the presence of the mobile testing unit. The unit, which was parked in the school's parking lot for a few days, aroused a great level of interest and was at times surrounded by curious children. The subjects seemed to be very excited about "being tested" in the unit, and this reaction may have overshadowed the differential effects of the independent variables. This is particularly true of the middle-class group, as the low-class children had seen the testing unit on previous occasions.

In summary, the second experiment yielded the following conclusions:

1. A strong generalization across experimenters for the low-class subjects. The underprivileged children did not show person specificity, and the group means reflect lack of differentiation as to the individual identity of the source of reinforcing stimulation. Middle-class performance reflects no generalization across experimenters, with a weak tendency toward person specificity.

2. Low-class performance reflects strong reactivity to the immediate treatment.

3. Middle-class girls and low-class boys showed greater reactivity to social reinforcement than middle-class boys and low-class girls, respectively.

EFFECTS OF INFORMATIONAL INPUT

Third Experiment--"Few" and "Many" Information

The learning interpretation we suggested for SDSE shifts the emphasis from the stimuli themselves to the source of stimulation. It claims that the treatment provides the subject with the information needed for judging the experimenter, on the basis of which the subject forms his notion of (this experimenter's) reinforcement value. The previous experiments dealt with the person specificity of this effect. The present experiment studies another aspect of this interpretation--the processing of the information inherent in the D- and S-treatments.

The suggested interpretation of SDSE stresses the learning which is facilitated by the treatment, rather than viewing the treatment as creating a motivational state which determines performance. The treatment is viewed as the opportunity the child has to attain the appropriate information. As a test for these ideas, the third experiment was designed to provide the subjects with the appropriate information directly. The information is

transmitted through verbal channels, not by means of actual dispensation of reinforcement.

The main difficulty lies in defining what is the information inherent in the S- and D-treatments and, after the information has been delineated, to construct an appropriate procedure to transmit this information. One must remember that the suggested interpretation differs from Zigler's valence hypothesis in that it does not posit the creation of a general affective reaction to the reinforcing person, but rather tries to deal with one's reinforcing qualities alone, keeping other factors unchanged. Thus, we decided to give the subjects only one item of information bearing directly on the frequency of reinforcement typically dispensed by the experimenter. The subjects were told that the experimenter says good either "many, many times" or "very few times." These statements were supposed to be cognitive functional equivalents of S- and D-treatments.

Another suspected difficulty was that even when a child has an expectation of receiving a high frequency of good emissions, perhaps the reinforcement value does not really drop until he has received several and confirmed his expectation. This may result in patterns of performance slightly different from those of the first experiment.

In specific terms, this experiment deals mainly with the question whether the cognitive input (information) is really a functional equivalent of the information derived from actual D- and S-treatments. Our hypothesis is that these two types of information correspond to each other, and,

although they come from different sources, they would interact and affect each other's effect on test performance. To test this hypothesis, subjects received both informational input and actual D- and S-treatments, either compatible ("Many" + 20 presentations of good, or "Few" + 2 presentations of good) or incompatible ("Many" + 2 presentations, or "Few" + 20 presentations).

The information was given to the subjects prior to the actual treatment (by both the teacher and the experimenter who brought them to the experimental room). As a result, it was thought that the treatment would be judged on the basis of the expectations established by the earlier informational input.

As a third in a series of studies, control groups were available from the earlier experiments. The first experiment provided groups who received an actual treatment but no information, enabling us to add a third (no-information) to the two existing information conditions.

Procedure. The initial information about this experiment was given to the subjects by their teachers. A "game with cards" was mentioned, and it was pointed out to the children that "this lady" occasionally "says good." One group ("Few") was told that the experimenter usually says good very few times, while children in other classrooms ("Many") were told she says good "many, many times."

Each child was taken from his classroom and brought to the experimental room by a person other than the experimenter. This person repeated

the information and made sure that the child remembered the information on "Few" or "Many." In the experimental room a D- or S-treatment was administered following the regular procedure. The only difference was that, unlike the first experiment, the experimenter did not leave the room at the completion of the treatment but proceeded directly to administer the discrimination test.

On the way back to the classroom, the same person conducted a short inquiry. Each child was asked to describe what happened in the room, and when he did not mention it himself, he was asked whether he received "more good's than he expected or less."

Results and discussion. The number of reinforced responses of the experimental groups in the 75-item test was subjected to three analyses of variance. The first analysis deals with the performance of the middle-class group only (Table 8); the second, low-class group only (Table 9); and the third (Table 10) combines all subjects, including sex of subject as an additional factor. (This separation was made for purposes of exposition, as it enables us to discuss each social-class group separately.)

The analysis of variance of the middle-class group (Table 8) shows a significant effect of the informational input, with neither a treatment effect nor an information X treatment interaction effect. The pattern of the group means is shown in Fig. 7. The information effect is clear, both "Few" groups showing a higher performance than their corresponding "Many" groups. While treatment alone (first experiment) produced a strong effect,

Table 8
Analysis of Variance of Test Scores for Middle-
Class Subjects in Experiment 3

Source	df	MS	F	p
Information (A)	1	1760	4.87	<.05
Treatment (B)	1	129	<1.00	
A x B	1	680	1.88	
Error	24	361		

Fig. 7. Pattern of Test Performance of Low- and Middle-Class Groups Who Received Both Information and Treatment.

middle class low class



Information :

FEW

MANY

FEW

MANY

Treatment :

D-

D-

S-

S-

the juxtaposition of information and treatment resulted in a strong effect of the informational input. Contrary to the strong information effect, there is no significant treatment effect, and the mean performance of the satiation groups was actually slightly higher than that of the deprivation groups.

However, the strong information effect and the absence of a treatment effect means neither that the information was the only determinant of performance nor that the treatment did not affect performance. What it seems to indicate is that, in light of the informational input, the meaning of the treatment was modified, resulting in a new pattern of performance. Most salient is the particular interaction of "Many" information with a D-treatment. This group showed an exceptionally low performance, much lower than both the other "Many" group and the other D-group. On the basis of maintenance level studies, one could predict that these subjects (who actually received in treatment less good emissions than they expected) would feel most "deprived" and show a high performance. The fact that this group did not perform like other D-treatment groups and showed a very low performance must be attributed to the preceding information. In other words, an interaction of specific information with a particular treatment is implied.

Our speculation to explain the low performance of the Many/Deprivation group is that the actual experience of receiving good emissions in a very low frequency when "many, many good's" were expected seems to have frustrated these (middle-class) children, and as a result they detached themselves from the situation and proceeded to choose the pictures they preferred

in the discrimination test, regardless of the experimenter's reinforcement. This interpretation is supported by verbal reports of three (of the seven) subjects in this particular group. (These three subjects, incidentally, had the lowest frequency of reinforced responses in that group.) All three made it clear that, although they clearly understood the reinforcement contingency in the test, they nevertheless chose their favorite pictures. Said Stephen: "I saw she says good every time I pick plants, but I chose mainly animals." Archie stated that he chose the pictures he liked, which were animals, but that he knew she said good when plants were chosen. Similarly, Howard said he chose animals mainly but that she said good when he didn't choose animals. No such statement was made by any other subject in any other condition. On the contrary, several children reported choosing the "correct" picture because that was "what I was supposed to do" and because "she said good when I chose these pictures."

The results of the low-class groups are very different from the middle-class pattern. The analysis of variance (Table 9) did not reveal any significant effect. As Fig. 7 shows, the means of the two D-groups were somewhat higher than those of the two S-groups, while there was no systematic pattern to the means of the "Few" and "Many" groups. Thus, we must conclude again that the performance of the low-class groups is generally undifferentiated, with little distinct reaction to the specific experimental variables.

The analysis of variance which combines all subjects is presented in Table 10. As the table indicates, the sex of the subjects was involved in

Table 9
Analysis of Variance of Test Scores for Low-
Class Subjects in Experiment 3

Source	df	MS	F
Information (A)	1	69	< 1.00
Treatment (B)	1	514	1.33
A x B	1	165	< 1.00
Error	24	386	

Table 10
Analysis of Variance of Test Scores for All
Subjects in Experiment 3

Source	df	MS	F	p
Information (A)	1	566	2.13	
Treatment (B)	1	64	< 1.00	
Social class (C)	1	833	3.14	< .10
Sex of subject (D)	1	1617	6.10	< .05
A x B	1	931	3.51	< .10
A x C	1	729	2.75	< .11
A x D	1	2369	8.93	< .01
B x C	1	930	3.51	< .10
B x D	1	193	< 1.00	
C x D	1	986	3.72	< .07
A x B x C	1	13	< 1.00	
A x B x D	1	1029	3.88	< .06
A x C x D	1	66	< 1.00	
B x C x D	1	805	3.04	< .10
A x B x C x D	1	351	1.32	
Error	40	265		

most effects. In general, boys showed a higher performance than girls (D effect), but this effect was caused mainly by the differences between low-class boys and girls, while sex did not affect the performance of middle-class children (C x D effect). The low-class difference is in line with our earlier observations, while the absence of sex differences in the middle-class group was not anticipated. It probably stems mainly from the fact that the middle-class boys seemed more involved than they were in the earlier experiments. The two experimenters independently and voluntarily reported that they felt the middle-class boys to be more involved than in the other experiments, and they attributed this fact to the explicit information which was given to the children prior to the experimental session.

The sex of subjects also interacted with the information factor (A x D effect), boys performing higher than girls in the "Few" groups, with no differences in the "Many" groups. Furthermore, the triple interaction of information, treatment and sex of subjects (A x B x D), reflects the fact that boys performed lower than girls in the Many/Deprivation groups, but showed a higher performance in all other groups. Thus, it seems that the boys were more sensitive to "deprivation" experiences in general, but particularly responsive (by low performance) to the (frustration of the) Many/Deprivation combination.

Turning now to class differences, we find that, while D-treatment resulted in a somewhat higher performance than S-treatment in the low-class groups, the reverse was true for the middle-class group (B x C effect).

This may be the result of the very low performance of the middle-class Many/Deprivation group, low in spite of the D-treatment these subjects received. The $A \times C$ interaction effect probably reflects the stronger effect of information on middle-class children and the stronger effect of the actual treatment on underprivileged children.

The discussion thus far has been confined to the results of the third experiment alone. However, the first experiment provides appropriate control groups to the present experiment. While all four groups in the third experiment received both information and treatment, the first experiment included two groups who received treatment (by the same experimenter) but not information. We can thus examine the interaction of information and treatment in a design containing a "no-information" condition.

The analysis of the middle-class group is presented in Table 11, and the analysis of the low-class group in Table 12. The differences between the two analyses is striking. The middle-class analysis reveals a significant information effect and a strong interaction of information and treatment, while the low-class analysis reveals undifferentiated performance, with a tendency toward a treatment effect.

These differences are dramatized in Fig. 8, which shows a strong interaction of information and actual treatments in the middle-class groups and no interaction in the low-class groups. With "no-information," the middle-class groups show a typical SDSE pattern. Adding the "Few" information moderates this effect, while "Many" information reverses the trend.

Table 11

Analysis of Variance of Test Scores for Middle-Class Subjects
in Experiments 1 and 3 (Two treatments and
three information conditions)

Source	df	MS	F	p
Treatment (deprivation, satiation) (A)	1	833	2.66	
Information (few, no information, many) (B)	2	1286	4.11	< .05
A x B	2	1678	5.36	< .01
Error	42	313		

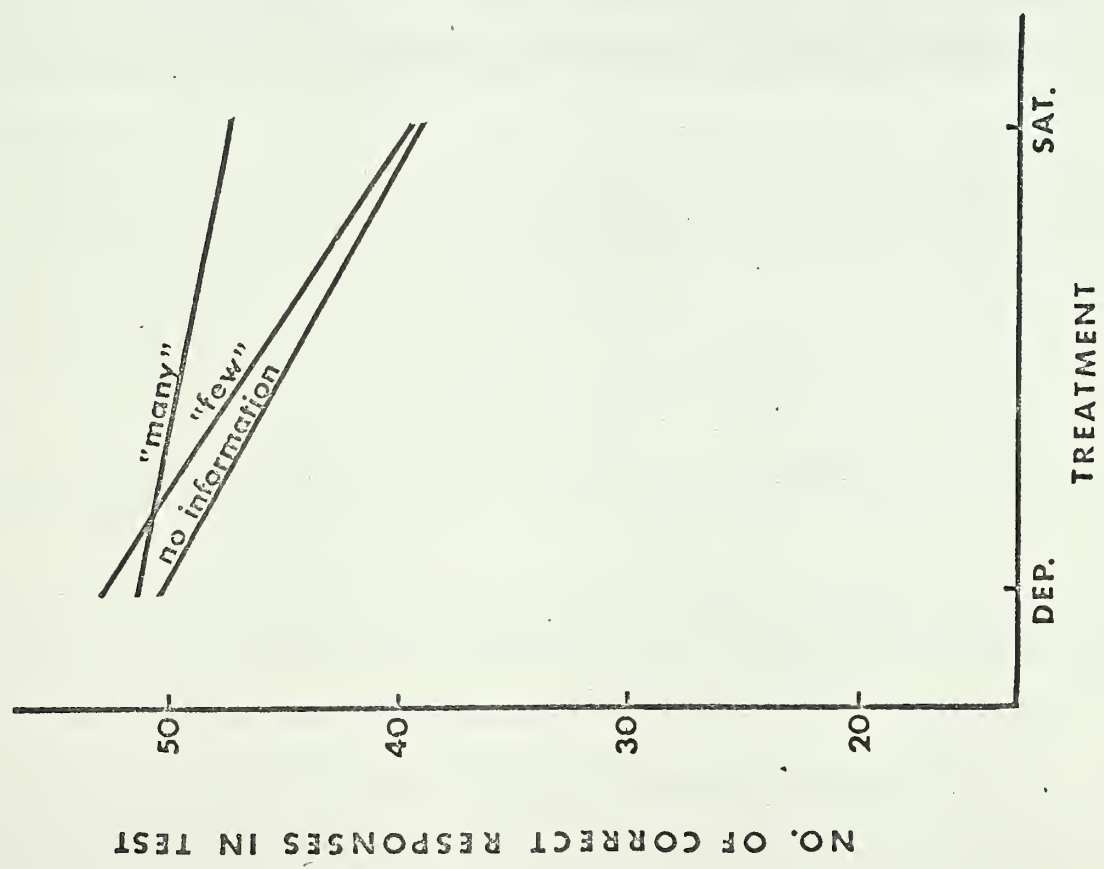
Table 12

Analysis of Variance of Test Scores for Low-Class Subjects
in Experiments 1 and 3 (Two treatments and
three information conditions)

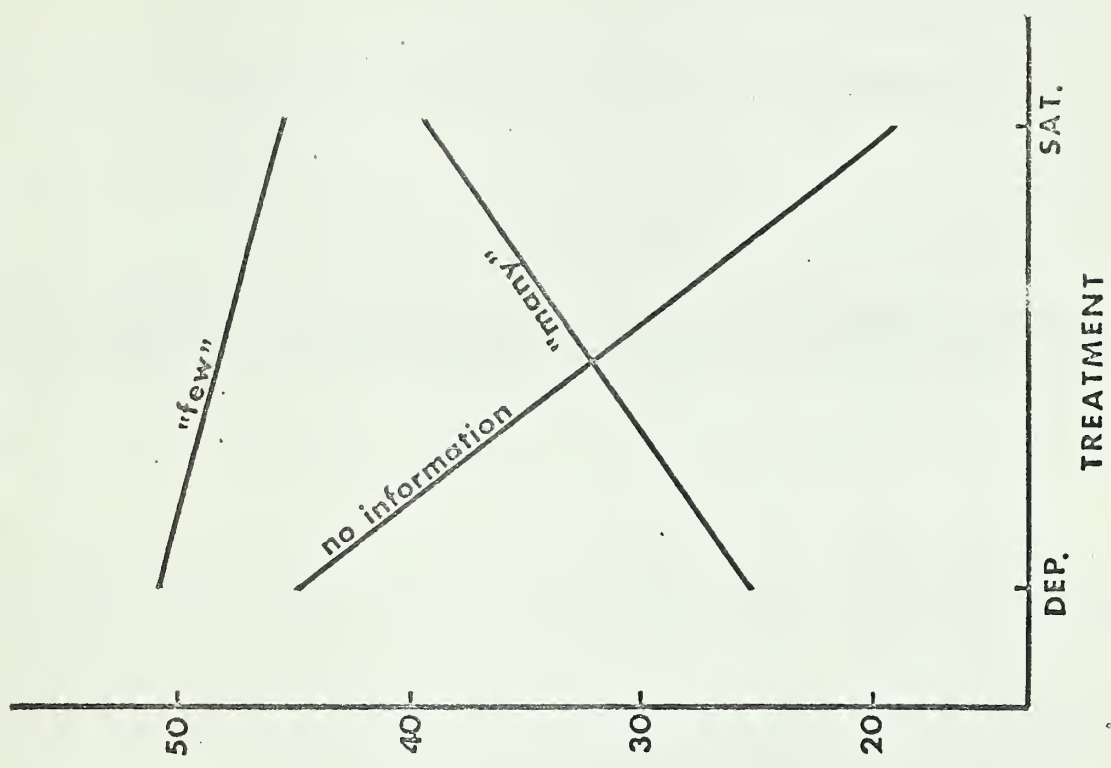
Source	df	MS	F	p
Treatment (deprivation, satiation) (A)	1	1131	3.14	<.10
Information (few, no information, many) (B)	2	91	<1.00	
A x B	2	93	<1.00	
Error	42	360		

Fig. 8. Patterns of Test Performance in Combinations of Informational Input and Actual D- and S-Treatments.

A. LOW-CLASS



B. MIDDLE-CLASS



The low-class groups, on the other hand, show a very weak tendency toward a SDSE in all three information conditions, and the information does not seem to affect performance or interact with the treatment in any significant way.

Finally, the post-test inquiry shed more light on the effect on test performance of the interaction between the informational input and the actual treatment. Forty-nine of the 56 subjects gave clear answers to the question whether they received "more good's than they expected or less." These answers were subjected to a number of chi-square tests, the null hypothesis being that the frequency of "more than expected" would be equal to the frequency of "less than expected" under any condition. The only significant chi-square result for the low-class group was found for the Few/Deprivation group. This group showed the highest performance, and the frequency of "more than expected" reports was significantly higher than the frequency of "less than expected" ones ($X^2 = 3.57$, $p < .05$). The tests for all other low-class groups did not yield significant differences. The picture was reversed for the middle-class groups, where only the low-performing group (Many/Deprivation) did not yield a significant chi-square result. The Few/Deprivation and Few/Satiation groups had a significantly higher frequency of "more than expected" reports ($X^2 = 6.0$, $p < .01$ and $X^2 = 4.0$, $p < .025$, respectively), while the Many/Satiation group had a significantly higher frequency of "less than expected" reports ($X^2 = 3.57$, $p < .05$). Thus, we reaffirm our conclusion that the informational input was influential on the

middle-class children, seemingly establishing expectations on which basis later frequency of reinforcement was judged.

In summary, we have reached the following conclusions:

1. Middle-class subjects reacted strongly to informational input, while low-class subjects did not react to informational input and showed a weak tendency to react to the actual treatment.
2. The performance of the middle-class groups indicated a strong interaction of information and treatment. No such interaction was found for the low-class groups.
3. The performance of the low-class groups was generally undifferentiated. The performance of the middle-class groups was well differentiated, with different patterns in reaction to specific combinations of information and treatment.
4. Low-class boys showed a higher performance than girls, while no such difference was found for the middle-class subjects.
5. Boys, in general, were more sensitive than girls to deprivation conditions.

DISCUSSION

Summary of Results

Based on the suggested interpretation of SDSE, the studies reported in this paper tested two major hypotheses, dealing with person specificity and the effects of informational input. Underlying these hypotheses was the claim that the mere number of presentations of social reinforcement is insufficient for dealing with a phenomenon such as the SDSE. Unlike food, which directly satisfies a tissue need, social reinforcement carries a particular meaning for the recipient, and is received in a particular social setting. We tried to deal with the problem of meaning through the informational input operations, and with at least one aspect of the social setting by exploring the problem of person specificity.

The results of the three experiments consistently supported hypotheses derived from the cognitive interpretation of SDSE. However, these hypotheses were specifically confirmed only in the case of the middle-class group, while some of the independent variables (same-other experimenter,

informational input) failed to create differential effects in the low-class group. We will first discuss the implications of the middle-class results, and later try to suggest why the pattern of performance of the low-class group was different from that of the middle-class group.

We hypothesized that the SDSE is person-specific and would not readily generalize to another experimenter. In a direct test of this hypothesis, middle-class children were found to show a typical SDSE pattern under Same-E conditions, but no effect under Other-E conditions. The second experiment contrasted the effect on test performance of an immediate treatment administered by E_2 with the effect of earlier treatments administered by E_1 . Although the immediate treatment affected performance somewhat, the results for the middle-class groups indicated quite a high degree of person specificity, with little influence of the immediate treatment on the effect of the remote treatments.

The second issue under study was the effect of informational input. The essence of the cognitive interpretation is that the SDSE is mediated by learning which takes place during the treatment period. The reinforcements received in this period are hypothesized to provide information relevant for the establishment of reinforcement value. Thus, we tried to separate the essential information from the actual experience of the D- and S-treatment itself.

Before we discuss the results of the third experiment, we should briefly mention a pilot study which preceded the third experiment not dis-

cussed in earlier sections. In this pilot study, subjects were given only information about the experimenter, and were then immediately tested by that experimenter. Although the differences were not statistically significant, the middle-class results showed a tendency toward a SDSE pattern, the "Few" group giving a somewhat higher number of reinforced responses in the test than the "Many" group. A trend analysis revealed that, while the "Few" group significantly increased the number of reinforced responses from one 25-trial block to another, the mean number of reinforced responses of the "Many" group remained unchanged in each block. This pattern was similar to the trends found in the first experiment for D- and S-groups (see Fig. 2, p. 46).

In the third experiment, all subjects received both information about the experimenter and a D- or S-treatment from that experimenter. The middle-class test performance was found to reflect a clear information effect and a strong interaction effect of information and treatment. These findings supported the notion that the information derived from the interaction with the experimenter plays a major role in determining subsequent test performance.

Thus, the findings of the three experiments were in accord with hypotheses derived from the suggested cognitive interpretation of SDSE.

The Cognitive Interpretation in Perspective

The approach we have taken to the Social Deprivation-Satiation Effect is not entirely novel, and as will be seen, there has been considerable concern on the part of several investigators with interaction contingencies similar to those of interest in the present study. However, these researchers were not focally interested in social reinforcement studies, as that particular kind of subject-experimenter interaction is artificial and less interesting in terms of the limited variety of possibilities for action by the participants. The initial starting point of the present author involved the SDSE, and the cognitive interpretation was brought forth to account appropriately for this effect. Thus, we will try to make a case for our interpretation as an appropriate general outlook for dealing with related problems in the field of social reinforcement.

In this study, we have focused on the nature of the interaction between the reinforcing person and the subject, with particular reference to the information of the factors in the environment which control the experimenter's behavior conveyed to the subject by that interaction. We hypothesized that this extracted information is processed by the subject and used to judge given attributes of the reinforcing person. We have tried to explicate the mechanisms underlying the subject's judgment, emphasizing the major importance of the perceived contingencies of the interaction.

The Cognitive Interpretation and S-R Theory

We question certain aspects of the application of traditional S-R theory to issues in human social learning such as the SDSE, proposing that it would be profitable to consider a whole set of additional variables and mechanisms. Gewirtz and Baer treated human performance under social reinforcement as a direct analog of animal performance under appetitive drives. They dealt exclusively with drive states, and not with other variables which would also affect reinforcement value. We claim that the SDSE is more complex, and the repertoire of S-R theory does not contain some of the concepts which seem necessary for an accurate account of this phenomenon.

To begin with, we must assume that human beings live in a particular social setting, and that they communicate verbally. Social reinforcement presumably does not operate in the same way apart from that context. Moreover, S-R theory makes no distinction between the reception of stimuli, reinforcing and otherwise, and the perception of the source of these stimuli. We call attention to the importance of the concept of a person as the source of the reinforcing stimuli. The reinforcing stimulus word per se is not to be seen as an anonymous event but as a stimulus which comes from a particular source with whom the child interacts. We found that the effectiveness of reinforcers varied as a function of changing the source of these stimuli. We are led to the conclusion that the effectiveness of reinforcers was partially determined by inferences made by the subjects regarding the source of reinforcement.

Thus, rather than concentrating on the reinforcing stimulus in relation to the organism's drive state, we prefer to deal with the perception of persons, on the subject's concept of another person as the source of reinforcing stimuli, and the process of making inferences regarding the attributes of that source.

To highlight the differences between the way we conceptualize the SDSE situation and the S-R treatment of this effect, we will present an outlined description of the differential stages and processes we suppose to be operating in the situation. The points in that description mention both the intermediate inferential cognitive processes and the actual behavioral component.

In the initial stage, the subject is stimulated by given auditory stimuli. The child hears the word good at a given frequency. Gewirtz's S-R conception relates this stimulation directly to a given change in reinforcement value and the final behavior. Our suggested conceptualization takes the stimulation as the first step in a series of cognitive events which eventually lead by a different route to a change in the reinforcement value. Thus, we must deal with the child's perceptions, his judgments and inferences, and the process of social comparison which he carries out. First of all, the child receives the word good from a particular person--the experimenter. He perceives the experimenter to be a person in interaction with him. It is important to note that the child forms a concept of that person as interacting with him. The reinforcing stimulus would not affect the child's behavior

were it not perceived as coming from a particular present person and directed at the child. We take it for granted, for example, that the effect would not occur if the stimuli were heard over the radio or if good came from a present person but not directed at the child. These commonsensical unspoken assumptions about the situation refer to the essence of SDSE.

After the concept of the person as the source of stimulation and as interacting with the child has been established, the cognitions focus on a particular aspect of the situation--the contingencies of the interaction. The child perceives the extent to which the experimenter's behaviors are influenced by his own behaviors. On the basis of these perceptions, he judges whether the interaction is "genuine"--whether his own actions influence the experimenter's behavior. This judgment involves a process of social comparison, and we must presume that the child compares this person's reactivity with the level of reactivity he is accustomed to encounter from adults. Once the contingencies of the interaction with this adult have been compared with characteristic reactions of other people, the reinforcement value of good from this person for this child is established. If the experimenter's actions are not contingent upon the child's actions, it is not worthwhile to perform for him. On the other hand, if the experimenter's behavior is highly contingent on the child's, his reinforcement value is high. The actual selection of pictures in the discrimination task is a product of the reinforcement value.

S-R analysis considers only the initial and the final stages of this description. The terminal behavior is seen as a direct function of the fre-

quency of received stimuli. Our account of the situation attaches the utmost importance to these intermediate inferential processes. We think that the child's perception of the source of the stimuli and his perception of the contingencies, followed by his inferences which lead to the formulation of reinforcement value, are the crucial factors for a conceptualization of SDSE. The specific mechanisms missing from a simplified S-R theory which we feel are crucial for an adequate description of what transpires in this situation are such ideas as holding the concept of a person, having the concept of a source of reinforcing stimuli, making inferences about the variables controlling the behavior of another person, and finally, the social comparison process. Moreover, on the basis of these ideas it is possible to predict the SDSE without resorting to the intrinsically somewhat dubious notion of a general social drive.

A comment should also be made regarding a special mode of thought derived from S-R theory, namely, Gewirtz's atheoretical position. It is extremely hard to deal with an atheoretical position, since it does not offer a framework in which experimental results can be generalized. In the absence of an explanatory framework, Gewirtz's functional relationships cannot be generalized across the specific experimental situations he utilized. Although Gewirtz seems to imply that these relationships represent "general laws," we have found them in this research to be person-specific, limited to a particular social-class group and varying between the sexes. Undoubtedly, further research would probably yield additional limitations on the generality

of these functional relationships.

Interaction Contingencies

To place this report in a larger context of relevant research in psychology, we will now present some ideas which reflect a similar interest in the contingencies of the interaction. Although these ideas deal with interactions in which the variety of possibilities for action is wider and the nature of the interaction is not so rigidly prescribed, they are still relevant to the child-experimenter interaction we have dealt with, and they provide a more general perspective to the suggested interpretation of SDSE.

Thibaut and Kelley's (1959) theory of interaction outcomes takes the interactions themselves as the independent variables, the dependent variables being the outcomes of these interactions. They stressed the importance of mutuality and the efforts the interacting parties must make to synchronize their behavior and eliminate incompatibilities. Thibaut and Kelley also discussed the changes in reward value which occur before the outcome matrix stabilizes.

Based on Heider's (1958) initial ideas on person-perception and his causal analysis of this process, Jones and Davis (1965) further developed ideas regarding the attribution of intention. They assumed that the perceiver begins with the observation of an overt action of another person, and that he then makes certain judgments about this person which further permit him to make inferences about this person's intentions.

As we said, although basically dealing with different types of interactions, Jones and Gerard's (1967) conceptualization of interaction contingencies is very relevant to our discussion. It is most relevant to our discussion of the sense of "genuine interaction." Jones and Gerard pointed out the "complexity of partial give-and-take in the dyad when behavior is neither exclusively governed by roles nor totally 'captured' by incoming social stimulation" (p. 513). Their description of particular types of contingencies comes close to our earlier delineation of the perceived contingencies in D- and S-treatments and the distinction between "genuine" and "nongenuine" interactions. "Asymmetrical contingency" was defined by Jones and Gerard as "a type of dyadic interaction in which the responses of one person are mostly determined by his own plan for the interaction, while the responses of the second person are mostly determined by the responses of the first. The second person reacts, without a plan, to the planned responses of the first person" (p. 707). On the other hand, a "mutual contingency" is defined as "a type of dyadic interaction in which the responses of each person are jointly determined by the responses of the other and by his own motivated plans. That is, the actions of both parties are to an important extent purposeful and self-determined, but each is responsive to the other" (p. 715). In these terms, both D- and S-situations may be thought of as involving asymmetrical contingencies. Our hypothesis would then be restated to distinguish between the actual contingencies and the perceived contingencies, the latter being somewhat like the asymmetrical in the case of satiation,

and closer to the mutual contingencies in the case of deprivation.

Jones and Gerard complained that "those working in the operant conditioning field sometimes write as though the experimenter were nothing but a programmed 'machine' dispensing pellets of reinforcement following selected responses" (p. 547) and claimed that attention must be given to the interactive aspects of the learning situation. However, most experimental work in this area involves other kinds of situations (such as prisoners' dilemma situations). The lack of interest in the social reinforcement situation probably stems from the limitations of this situation: the variety of behavioral choices in this case are quite limited, the plan of action is rigid, and the dependent variables do not bear directly on aspects of the interaction. Moreover, the actual interaction in the social reinforcement studies can never reach Jones and Gerard's category of "mutual contingency."

Further Directions of Research

To further substantiate the cognitive interpretation suggested in this paper, the judgments made by the subjects must be studied in more depth. Such judgments are not easy to study, and maybe the informal inquiries of the third experiment should be widened into exhaustive interviews. In that case, older subjects should be used.

More research should also focus on the notion of contingency and the

perception of interaction contingencies in this situation. Crucial in our conceptualization of SDSE was the difference between the perceived contingencies in D- and S-treatments. In actuality, reinforcement was never contingent upon actions of the subjects. It would be interesting to find out whether the same SDSE patterns would be found if all reinforcement is made explicitly contingent upon completion of specific tasks. In such a case, the number of reinforcement presentations would still be varied, but the subjects would in all cases be made aware of the contingencies.

Another interesting direction could deal with changes in reinforcement value which occur in the test itself (rather than the treatment, our focus thus far). Instead of giving a 75-trial test, subjects would be allowed to continue responding until they satiated and did not wish to continue the discrimination process. The patterns of performance in this test situation could add to the ideas regarding changes in reinforcement value. This dependent variable could probably also throw more light on the differences between middle-class and low-class children.

In this context, we should mention again the fact that the performance of children who received a D-treatment continued to increase in the test from one trial block to another, even though at the completion of the first block they had mostly received about twenty presentations of good, and at the completion of the second block they should have been highly satiated, if it were the case that the number of received reinforcements was the only determiner of performance. In the test, the high level of performance per-

sisted long after the number of reinforcements received in the pretest treatment had been surpassed.

Social-Class Differences

Let us now turn to the differences between the middle-class and the low-class groups. These differences were quite systematic across experiments, reflecting consistent patterns. The differences can be summarized as follows:

1. Regardless of the experimental condition, low-class children gave a higher number of "correct" responses in the test, awarding them with a higher number of good reinforcements.

2. While middle-class groups showed a typical SDSE pattern under Same-E conditions (first experiment), low-class subjects showed only a tendency toward such an effect, but with a smaller difference between D- and S-treatment groups.

3. Novelty in the experimental situation (the introduction of a new, unknown experimenter) increased middle-class performance but decreased low-class performance in the test.

4. Middle-class children showed a high degree of person specificity, while low-class children showed an undifferentiated performance, lacking in person specificity and generalizing from one experimenter to another.

5. Informational input had a strong effect on middle-class performance groups, but no effect on low-class performance.

6. Informational input strongly interacted with the effect of informational input on performance in the middle-class group, but no interaction effect was observed for the low-class group.

The fact that low-class subjects showed a higher performance than middle-class subjects, regardless of the experimental conditions, rules out the possibility that the social, nontangible reinforcement had no effect on these low-class subjects. On the contrary, their choice behavior in the discrimination test tended to be strongly affected by the social reinforcement received after a given choice had been made. On the other hand, low-class performance was characterized by three attributes: (a) a strong effect of the immediate, most recent event; (b) a strong reaction to the actual experience of receiving a good reinforcement, but no reaction to the more abstract variables (information, source of reinforcement); and (c) a generalized effect which lacks in differentiation between the particular experimental conditions.

We must remember that the child brings with him to the experimental situation a long history of interaction with people, young and adult. The child has his own maintenance level of social reinforcement, as well as impressions on the degree of interaction between people. On this basis, his reactions in the experimental situation involve among other things a process of social comparison. Thus, the above attributes may be related to certain

social facts and a cognitive style which is described in the literature to characterize early childhood training of low-class groups. Middle-class children usually grow in a stable environment, and they are taught at an early age to delay gratification and respond to symbolic events out of one's immediate reach or sensory experience. Low-class children, growing in a less stable and less rewarding environment, and lacking in training for symbolization, react strongly to the immediate, concrete events. Being relatively deprived of social reinforcement in general, the strong effect of the immediate good probably by far overshadows other, more subtle aspects of the situation.

A further possible reason for the low-class lack of differentiation may be a general feeling of strangeness these subjects seemed to have had in the experimental situation. The entire situation was probably quite unusual for the low-class subjects. The two (white) experimenters reported that they sensed a feeling of uneasiness and suspicion in the low-class subjects. Thus, the low-class children may have felt anxious and aroused, and on this basis undifferentiated performance could be expected. One indication of this is the fact that the introduction of a new experimenter in the first experiment inhibited low-class performance while increasing middle-class performance. It would be interesting to repeat these studies with low-class groups who were less uneasy and anxious. This could be achieved by using either experimenters who are somewhat familiar to the children and/or black experimenters.

APPENDIX

Appendix I

DATA OF THE THREE EXPERIMENTS*

		First Experiment											
Treatment		S-			S-			D-			D-		
Experimenter		Same			Other			Same			Other		
Middle Class		13	15	11	14	21	25	12	15	12	21	24	25
		9	7	7	16	25	25	13	10	9	21	25	25
		2	1	4	20	25	25	7	10	12	10	11	16
		9	8	8	19	23	24	20	23	23	11	11	12
		7	12	5	11	16	17	15	17	24	10	13	8
		1	1	1	11	9	13	12	17	17	11	8	11
		3	0	0	14	20	21	17	23	24	14	21	22
		2	1	2	5	8	10	7	11	10	19	25	25
		10	5	13	17	20	19	11	6	2	24	25	24
		9	8	14	11	10	10	19	25	25	17	25	25

*The scores represent the number of reinforced responses in each of the three 25-trial blocks.

Appendix I (continued)

		First Experiment											
Treatment		S-			S-			D-			D-		
Experimenter		Same			Other			Same			Other		
Low Class		19	25	25	6	19	19	22	25	25	19	25	25
		9	16	12	7	6	12	2	12	20	9	12	13
		15	18	15	3	4	5	9	12	15	12	12	19
		6	19	17	6	4	4	10	11	13	17	25	25
		4	0	0	6	11	13	16	19	19	19	18	24
		16	13	18	18	19	18	12	14	9	5	6	14
		13	23	20	12	13	8	19	24	25	4	0	1
		14	16	19	13	8	13	14	20	24	13	14	12
		5	5	6	12	12	13	11	16	14	13	16	11
		6	4	13	18	22	21	23	24	25	13	17	22

Appendix I (continued)

Control Groups (Test Only)

Middle Class			Low Class		
3	17	22	10	9	14
1	1	8	17	25	23
16	20	23	15	22	25
15	11	17	11	7	8
10	6	10	9	9	12
6	7	17	11	12	16
6	6	6	9	21	22
8	15	25	9	10	11
20	14	13	18	25	25
20	23	25	12	22	23

Appendix I (continued)

Second Experiment

Remote Treatment	D-			D-			S-			S-		
Immediate Treatment	D-			S-			D-			S-		
Middle Class	13	10	17	6	0	1	14	11	9	5	5	0
	24	24	24	11	21	24	11	4	7	0	0	14
	10	9	8	7	4	6	20	22	22	3	0	7
	4	3	4	4	11	11	10	14	20	14	14	20
	9	7	8	19	25	24	7	12	9	13	8	16
	20	24	25	3	3	6	13	13	14	14	13	19
	9	20	18	9	17	19	15	13	12	16	25	24
	15	19	14	20	24	21	1	0	10	12	7	12
	21	25	25	15	13	13	23	25	25	10	9	11
	11	25	25	20	24	25	13	13	13	10	13	12

Appendix I (continued)

Second Experiment

Remote Treatment	D-			D-			S-			S-		
Immediate Treatment	D-			S-			D-			S-		
Low Class	12	15	15	21	23	25	8	25	25	19	18	23
	4	22	23	12	19	25	21	25	25	10	15	14
	10	18	25	2	10	20	20	22	24	22	19	15
	18	25	24	0	9	21	6	16	13	7	5	7
	9	12	20	22	22	23	23	24	21	19	14	11
	16	25	24	12	9	9	7	14	16	3	2	4
	6	14	21	7	9	8	8	9	13	13	16	12
	7	17	22	13	10	11	14	24	25	6	2	0
	7	11	13	10	11	18	16	23	25	4	5	9
	21	23	24	19	17	11	18	25	25	8	8	8

Appendix I (continued)

Third Experiment												
Information	Few			Few			Many			Many		
Treatment	D-			S-			D-			S-		
Middle Class	8	7	6	8	4	11	1	4	2	12	15	23
	5	8	19	11	24	23	13	24	21	13	24	20
	18	24	23	10	25	25	6	15	24	6	8	12
	11	25	25	24	24	23	1	3	3	6	7	11
	20	25	23	10	5	3	6	0	3	16	18	19
	16	13	12	12	15	15	15	12	13	7	7	9
	19	25	24	12	16	17	3	0	7	13	15	14
Low Class	13	19	12	8	5	4	19	17	15	19	11	9
	11	25	25	8	7	6	22	24	25	15	7	5
	13	19	12	9	9	8	15	20	17	8	15	23
	13	8	11	8	5	8	24	24	25	8	22	22
	17	21	18	22	20	21	3	2	1	18	23	23
	24	24	23	20	25	24	13	10	14	22	22	16
	23	25	25	16	22	22	22	24	23	15	15	15

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